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*Managing Water in the West*

# Green River Pumping Project Draft Environmental Assessment and Biological Assessment PRO-EA-10-002

**Central Utah Project, Uintah Unit, Uintah County, Utah**
**Upper Colorado Region**
**Provo Area Office**

**U.S. Department of the Interior**
**Bureau of Reclamation**

**April 2010**

# Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

# Green River Pumping Project Draft Environmental Assessment and Biological Assessment

## Central Utah Project, Uintah Unit, Uintah County, Utah
## Upper Colorado Region
## Provo Area Office

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**Bureau of Reclamation**

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# Chapter 1 – Need for Proposed Action and Background

## 1.1 Introduction

The Uintah Water Conservancy District (District) located in Uintah County, Utah, has requested a temporary contract from the Bureau of Reclamation for water service from Flaming Gorge Reservoir, an initial unit of the Colorado River Storage Project. This temporary contract would be for up to 10,000 acre feet (af) per year (af/yr) of water for use at its new Green River Pumping Project (GRPP), for a period not to exceed 5 years. Section 9(e) of the Reclamation Project Act of August 4, 1939 (53 Stat. 1187), and Section 4 of the Colorado River Storage Project Act of April 11, 1956 (70 Stat. 105) grants Reclamation the authority to enter into the proposed contract.

The Water Service Contract would be for a maximum of 5 years. Water would be pumped from the Green River through a series of pipelines to supplement existing supplies from the Uinta and Whiterocks Rivers. To distribute this water, a new intake structure for the GRPP would be constructed on the Green River near Ouray National Wildlife Refuge, approximately 20 miles below the Jensen gauge near Jensen, Utah. Lands in the Ouray Park Irrigation Company (OPIC), Uintah River Irrigation Company (URIC), and Whiterocks Irrigation Company (WIC) would receive GRPP water. An overview map showing the GRPP facilities and lands to be served is shown in Figure 1.

The United States and the State of Utah are currently meeting to determine administrative policy and criteria requirements for the delivery and use of water from Flaming Gorge Reservoir. The potential contract resulting from this environmental assessment (EA) would be a temporary Water Service Contract to receive water from Flaming Gorge Reservoir until new policies and criteria are established. While the contract being considered for this analysis is only for a maximum of 5 years, the District has indicated its intent to request a long-term contract in the future. This long term contract would be for 40 years, the maximum contract term Reclamation may offer. Thus, the analysis presented here is for a 45 year period.

Reclamation has prepared this EA to comply with procedural requirements of the National Environmental Policy Act of 1969 (NEPA), Public Law 91-90, as amended, and the Council on Environmental Quality and Department of the Interior regulations implementing NEPA. This EA analyzes the potential impacts of the proposed action in comparison with a no action alternative. As required by

the NEPA implementing regulations, if potentially significant impacts to the human environment are identified, an environmental impact statement would be prepared. If no significant impacts are identified, Reclamation will issue a Finding of No Significant Impact (FONSI).

This EA describes the environmental effects of executing a temporary Water Service Contract between Reclamation and the Uintah Water Conservancy District (District) for up to 10,000 acre-feet per year of Colorado River Storage Project Water stored in Flaming Gorge Reservoir, for a period not to exceed 5 years. The potential effects of constructing the GRPP are analyzed as part of this proposed action, as well as the potential effects of use of this quantity of water through execution of a long term contract in the future. Under the No Action Alternative, Reclamation would not enter into a Water Service Contract with the District and diversion of water from the Green River would not occur.

This EA also serves as a Biological Assessment (BA) for the purposes of consulting with the U.S. Fish and Wildlife Service (Service) pursuant to Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531-1534).

## 1.2 Background

The District has identified a need for development of increased irrigation water in the western portion of Uintah County, Utah. Currently, irrigated lands served from the Uinta River Drainage are limited by a 1923 Federal Court Decree to 3.0 af/acre of water annually. Lands served from the Green River have a duty of 4.0 af/acre. A recent study (Conceptual Analysis of Uinta and Green River Water Development Projects, 2007) estimates a current shortage of over 45,000 af/yr for irrigated lands served from the Uinta River. In addition, the study estimates a potential for up to 7,700 acres of new lands in the Ouray Park/Leota Bench area that if served the 4.0 af/acre duty would increase the demand by another almost 31,000 af/yr. Therefore, a total of up to 76,000 af/yr of water would be required to bring all existing and potential new lands in western Uintah County to a full water duty.

The District has actively pursued water development in Uintah County to help satisfy water shortages such as those described above. Recently completed projects include: the West Side Combined Canals Salinity Project, the Moffat-Ouray Pipeline Salinity Project, Brough Pipeline Project, the Steinaker Reservoir water level increase, the Island Ditch Project, and several Green River water right segregation projects. In addition to these, the District assisted others in developing the Red Wash Dam and Reservoir and pursuing the Whiterocks Irrigation Company Storage Project. Thus, GRPP is one in a series of projects sponsored by the District to alleviate water shortages and improve water use in Uintah County.

## 1.3 Purpose of and Need for the Proposed Action

The proposed action is Reclamation's execution of a temporary Water Service Contract with the District for up to 10,000 af of water per year for up to five years from Flaming Gorge Reservoir for use by the GRPP. The District's purpose in entering into a contract is to assure a stable water supply to meet irrigation demands in western Uintah County. The District has a need to respond to water shortages in western Uintah County as discussed in Section 1.2 above.

## 1.4 Permits, Licenses, and Authorizations Required

Implementation of the Proposed Action could require a number of authorizations or permits from state and federal agencies whether or not the District enters into a Water Service Contract with Reclamation. The District would be responsible for obtaining all permits, licenses, and authorizations required for the Proposed Action. Potential authorizations or permits may include those listed in Table 1.1 and others not listed.

**Table 1.1**
**Permit and Authorizations Required**

| Agency/Department | Purpose |
|---|---|
| Utah Division of Water Quality | Utah Pollution Discharge Elimination System (UPDES) permit required for dewatering. |
| Utah Division of Water Quality | Storm Water Permit under Section 402 of the Clean Water Act if water is to be discharged as a point source into the Green River. |
| State of Utah Department of Natural Resources. Division of Water Rights | Stream Alteration Permit required under Section 404 of the Clean Water Act and Utah statutory criteria of stream alteration described in the Utah Code. |
| U.S. Army Corps of Engineers | Permit under Section 404 of the Clean Water Act for construction activities in waters of the United States, and/or construction activities affecting wetlands. |
| Utah State Historic Preservation Office | Consultation pursuant to Section 106 of the National Historic Preservation Act, 16 USC 470. |
| State Sovereign Lands Easement | The State of Utah owns the river bed land between the high water lines of the Green River. An easement is required for construction activities upon state lands. |

| | |
|---|---|
| United States Fish and Wildlife Service, Ouray Wildlife Refuge | Special Use Permit to use existing road across refuge lands to access pump station. This permit would not be needed if the road is aligned adjacent to the refuge property line on private property. |

## 1.5 Scope of Analysis and Content of this EA

The purpose of this EA is to determine whether or not Reclamation should enter into a Water Service Contract with the District for up to 10,000 af per year of Colorado River Storage Project water stored in Flaming Gorge Reservoir, for a period not to exceed five years. That determination includes consideration of whether there would be significant impacts to the human environment. In order to build the intake structure and pumping station, this EA must be completed and a FONSI issued for the proposed temporary Water Service Contract. Although the District has built some components of the project, the scope of analysis for construction impacts is limited to the proposed intake structure site on the Green River near Ouray National Wildlife Refuge. Analysis of operation impacts includes not only the operation of the intake structure and related pumping station, but also distribution of the water through the GRPP delivery system.

The Proposed Action is the execution of a temporary contract for a supply of up to 10,000 af per year of water for a period of up to five years. The capacity of the proposed GRPP is 10,000 af per year, and the District has stated its intent to pursue a long term (40 year) Water Service Contract for 10,000 af per year in the future. Because this EA also serves as a BA for Endangered Species Act (ESA) consultation purposes, and because the Service needs to analyze potential impacts of the proposed intake structure at its full capacity for forty years (the maximum possible term for a contract with Reclamation), the proposed action alternative presents the effects of operation at 10,000 af per year.

This EA consists of the following chapters:

1) Need for Proposed Action and Background
2) Proposed Action and No Action Alternative
3) Affected Environment and Environmental Effects
4) Environmental Commitments
5) Consultation and Coordination
6) Preparers
7) References
8) Figures
9) Appendix

## 1.6 Related Projects and Documents

### 1.6.1 Relationship to Water Delivery Projects

Related projects include the West Side Combined Canals Salinity Control Project (WSCCSP), the Moffat Ouray Salinity Control Project, and the Ouray Park Salinity Control Project. Construction on these projects began in 2000 and was completed in 2008. These projects combine several canals on the west side of Uintah County into one piped canal system. In their entirety, the projects piped over 50 miles of unlined canal and several miles of unlined laterals. These piped canals and laterals would be used to help deliver water developed by the GRPP, as described in Chapter 2, Section 2.3.3.

### 1.6.2 Operation of Flaming Gorge Dam Final Environmental Impact Statement and Record of Decision

The Operation of Flaming Gorge Dam Environmental Impact Statement (FGEIS) published in September 2005, analyzed and disclosed the effects of meeting flow and temperature recommendations proposed by the Upper Colorado River Endangered Fish Recovery Program. In February 2006, a Record of Decision was signed which implemented those flow and temperature recommendations.

This environmental assessment is tiered, as defined in 40 C.F.R. 1508.28, from the FGEIS.

### 1.6.3 Other Planning Activities

Given the multiple management agencies, tribes, state and local interests in the Green River below Flaming Gorge Dam, there are numerous related environmental impact statements, environmental assessments, and management plans or planning documents that involve the same geographic area as this environmental assessment.

# Chapter 2 – Proposed Action and No Action Alternatives

## 2.1 Introduction

he Proposed Action analyzed in this EA is Reclamation's execution of a temporary Water Service Contract with the Uintah Water Conservancy District (District) to provide up to 10,000 af of water per year from Flaming Gorge Reservoir for a period not to exceed 5 years. Both the No Action and Proposed Action Alternatives are presented in this section of the report. Analyses include consideration of both an initial phase of operation in the amount of 8,500 af per year, and the full project phase of 10,000 af per year, which is the full capacity of the GRPP.

## 2.2 No Action Alternative

Under the no action alternative, Reclamation would not enter into a Water Service Contract with the District. Therefore, the proposed new intake structure would not be needed since diversion of water from the Green River would not occur.

## 2.3 Proposed Action

The District has requested a temporary Water Service Contract for water stored in Flaming Gorge Reservoir with Reclamation for up to 10,000 af of water per year, for a period not to exceed five years. The District has stated its intent to request, at some point in the future, a long term (40 year) Water Service Contract. Project water would be released by Reclamation from Flaming Gorge Reservoir. The proposed pump station site on the Green River is approximately 20 miles south of the USGS Jensen, Utah stream gauge (Figure 12). The 10,000 af per year total depletion was estimated as a future depletion for the State of Utah in the 1999 Upper Colorado River Commission's Official Depletion Schedule (UCRC Schedule). The UCRC Schedule was included in the modeling process for the Action Alternative of the FGEIS, although the site-specific diversion details were unknown at the time. The Proposed Action is tiered, as defined in 40 C.F.R. 1508.28, from the Action Alternative of the FGEIS.

As noted in Chapter 1, Section 1.6, the District has already begun construction of some GRPP components. Construction of the proposed intake structure on the Green River cannot proceed unless or until the proposed action is approved. Consultation with the U.S. Fish and Wildlife Service (Service) pursuant to

Section 7 of the Endangered Species Act is required because the proposed intake structure location lies in designated critical habitat for the razorback sucker (*Xyrauchen texanus*) and Colorado pikeminnow (*Ptychocheilus lucius)*, and lies upstream of designated critical habitat for the bonytail (*Gila elegans*) and humpback chub (*Gila cypha*). Because the action area of the project includes downstream areas, impacts to all four species are considered.

Under the Proposed Action Alternative the existing Nielson Pump Station would be removed and that site would be re-contoured and re-seeded to natural conditions. The bank would be revegetated with appropriate riparian vegetation to ensure remediation efforts are protected.

### 2.3.1 Project Design

**Pump Station**

The pump station would be constructed on an approximately 0.6 acre site adjacent to the Green River as shown in Figure 2 and 3. The pump station would be composed of a deep sump and inlet structure, trash rack, stop logs, fish screens, 4 main pumps, pump manifold piping, electrical transformers, power transmission line, pipeline drain, parking area, electrical control building and a short section of pipeline. The layout of the pumping plant with greater detail on the inlet and sump, pumps, trash rack, stop logs, fish screens, etc, is shown in Figure 4. The fish screens for the water intake would be 26 feet in horizontal width.

The Green River is a very dynamic stream that has required unique designs and detailed engineering to minimize impacts to the river and the surrounding environment. In order to stabilize the river bank at the site of the pumping plant, approximately 150 feet of permanent sheet piles spaced approximately evenly upstream and downstream of the facility would be installed to a depth of more than 50 feet below ground surface (approximately 15 feet below the river channel invert). The sheet piles would prevent further erosion of the bank and encroachment on the proposed intake structure. It is also anticipated that the flow velocity across the sheet piles would increase, thereby reducing the risk of sediment accumulation near the structure. Temporary sheet piles or an alternate, equally protective, measure would be provided during construction to allow excavations to disturb less land and isolate the construction activities from the river. Further upstream embankment protection would be provided by a rip-rap armoring system. The bank protection plan is shown in Figures 2 and 3. Downstream bank and backwater conditions would be monitored into the future by the District and additional protection would be added at District cost if erosion caused by the project is occurring.

The station would include a trash rack, stop logs and traveling fish screens. The trash rack would be oriented vertically, with horizontal bars, to minimize entrapment or build up of floating debris that occurs primarily during early

season high river flows, and to prevent the debris from entering the intake. The trash rack would also serve as a deterrent for fish entering and becoming entrapped in the intake. Greater detail of the trash rack is shown in Figure 5. Nominal opening size of the trash rack would be 1 inch. Any required cleaning or clearing of the trash rack would be performed manually.

Stop logs provide a method for isolating portions of the structure for cleaning, maintenance or repairs. The aluminum or fiberglass logs would be installed into vertical slots or brackets and removed using lifting equipment installed at the station.

The fish screens would be designed with 3/32" mesh openings and a minimum approach velocity (according to Service requirements) to minimize take of juvenile fish during pumping operations. Approach velocity is measured at 3-inches in front of (into the river) the trash rack and Service standards limit approach velocities to no greater than 0.33 feet per second (fps). The Proposed Action has received a minor variance from the Service for the 0.33 fps limit based on research into swimming speeds of the juvenile fish (described later). The limit may be slightly exceeded for short periods of time if the actions outlined in the Environmental Commitments section of this EA are strictly followed.

The screens would be installed at 22.5 degrees from vertical in order to help collect and convey any trapped material. The traveling continuous stainless steel mesh screen would be motor-driven and automatically cleaned via high pressure spray. Debris and fish removed from the screens would be sluiced back into the river, downstream from the station. The pressure of the cleaning spray can be adjusted to minimize fish injury. This process would assure that any fish which may actually find their way to the screens would not be trapped in the area in front of the screens or permanently removed from the river. Since the screened material would be returned downstream of the station, the fish would be unlikely to re-enter the facility.

Three 900-hp vertical turbine pumps would lift water from the Green River via the intake structure and pump it into a pipeline transmission system. A fourth pump, if installed in the future, would be used for redundancy purposes only. The station would be capable of pumping rates of from 20 to 53 cfs, depending on the number of pumps (one to three) in operation. Depending on budget constraints, either two or three of these pumps would be installed initially, with the remaining pump(s) added as required and as funds are available.

An all-weather gravel road and parking area would be constructed to provide reliable access to the station for inspection, operation, maintenance, repair, etc. Much of the road and all of the parking area and pump site would be raised to an elevation of between 4681.0 to 4682.0 feet, which is about one to two feet above the maximum expected water surface occurring during the 100-yr return interval flood event. As shown on Figure 2, this finish elevation is about four feet above

the existing ground surface elevation of 4677.5 feet. The pump building and control building finish floor elevations are at 4682.3 feet.

The pump station has been designed to accommodate the relocation of an existing private pump located about 400 feet (upstream) of the pump station. This private pump station (Nielson Pump Station) has a water right to divert up to 1,440 af/yr (1,236 af/yr proof submitted to the Utah Division of Water Rights) at a peak monthly flow rate of about 6.0 cfs from the Green River to serve the full irrigation demands of about 360 acres of land adjacent to the Green River. As shown in the photos in Figure 6, there has been significant bank erosion at the original site since the pump was installed. This has undercut the bank to the point that the pump facilities are being supported by a crane. The existing pump and intake would be removed from this site by simply lifting the pipe and intake out of the water without the need to enter the river or disturb the bank. Currently, this water is diverted from the Green River without adequate screening for endangered fish. The current intake screen consists of a 36-inch diameter cylinder screen about 14-inch deep on the end of the 12-inch intake pipeline. The screen mesh size is 1/8-inch for the purpose of keeping debris from entering the pump and plugging irrigation lines and sprinkler nozzles. There is no screen cleaning mechanism.

The existing pump will be relocated and installed at the GRPP site as shown in Figure 4 (top, center). It will draw water downstream from the trash racks and fish screens and pump to the agricultural fields. The new turbine pumps will not be used for this purpose. This existing pumping requirement is separate from GRPP water needs.

**Pipeline and Pond**

A 42” diameter HDPE pipeline will convey flows of up to 53 cfs from the Green River pumping station approximately three miles to the Valley View Pond. An additional approximately 1400 feet of 42-inch HDPE pipe will be installed to convey water from Valley View Pond to the existing Ouray Park Pipeline. Interconnections will also be provided from the existing Ouray Park Pipeline at the Ouray Park Inlet Pond to the inlets to two other irrigation laterals. Four separate meters will measure flows at various points on the pipeline to determine correct deliveries to locations along the alignment. A plan view of the pipeline and pond is shown in Figure 7.

Valley View Pond will be constructed to a capacity of 30 af with an average depth of about 7 feet and a surface area of about 5.5 acres (approximately 390 feet by 600 feet). The pond will be lined with clay to minimize seepage. The 4984-foot elevation (above mean sea level) maximum water surface elevation of the pond is lower than the existing ground surface elevation to eliminate potential overtopping and failure of the structure. The pond freeboard will be constructed to elevation 4987 feet which is three feet above the maximum water surface elevation and two to three feet above the existing ground surface elevation. The

entire pond area will be enclosed by a 6-foot fence. Water will enter the pond from the Green River Pipeline and exit through the "Connection Pipeline" that transports water from the pond to the existing Ouray Park Pipeline. A plan view of the Pond is shown in Figure 8.

### 2.3.2 Project Construction

**Pump Station**

A construction contract for the pipeline and pond was awarded to Western States Contracting in September 2009 with completion expected in the spring of 2010. Construction of the pump station is scheduled for spring 2010 with a completion in the spring of 2011.

The pump station would be constructed on a 0.6 acre site adjacent to the Green River as shown in Figure 2. Photos of the site are shown in Figure 9. It is estimated that less than 0.5 acres of wetland would be permanently impacted by construction of the pump station. Construction activities that have the potential to affect the Green River would occur after peak river flows estimated to be June 1. The existing Nielson Pump Station will be relocated to the GRPP site as explained in Section 2.3.1.

During construction, Green River flows must be separated from the construction area using Best Management Practice Guidelines provided by the Service. These guidelines require, among other things, installation of a non-erodible coffer dam around the construction site and removal of fish within the cofferdam-enclosed river section area prior to construction and removal (see Fisheries section of environmental commitments). The District would need to provide a detailed final design of the cofferdam to the Army Corps of Engineers and the State Of Utah prior to the issuance of the 404 and Stream Alteration Permit needed for this work. The Utah Division of Wildlife Resources (UDWR) would need to accomplish the fish removal. The District must give the UDWR a 30-day's prior notice in order to remove the fish when needed. All disturbed areas outside of the pumping plant, and parking area would be re-contoured and re-seeded to natural conditions.

A three-quarter mile long 16-foot wide permanent access road would be constructed from the existing county road to the pump station as shown in Figure 10. Construction activities would be confined to the existing 26-foot wide permanent road easement. The majority of lands within this corridor have been previously disturbed either by farming operations or road construction. New areas disturbed by GRPP will be re-vegetated to restore to native conditions.

A small portion of the access road (approximately 1,300 lineal feet for a total of 0.46 acres) runs in an existing roadway that slices diagonally across the south end of a parcel owned by the Ouray National Wildlife Refuge as shown in Figure 10. This existing roadway will be re-graded and new gravel surfacing applied to suit

all weather access requirements. However, the existing alignment and width will remain unchanged.

**Pipeline and Pond**

As stated above, construction of the pipeline and pond is under way with completion expected in the spring of 2010. Construction of the pipeline requires a temporary 100-foot wide easement (less than 100 feet in some areas) along the full length of the pipeline and a permanent 50-foot easement for operation and maintenance. Temporary staging areas are provided adjacent to the county road at pipeline station 30+00 and on both sides of the county road between pipeline stations 111+00 and 122+00, as shown on Figure 11. Clay material for lining the pond is hauled in from approved sources. For the most part, the pipeline is being constructed across previously undisturbed lands. All disturbed areas will be re-vegetated to restore to native conditions.

### 2.3.3 Project Operation

The GRPP would be integrated into the operation of the existing Ouray Park Pipeline and WSCCSP. The Ouray Park Pipeline currently serves the Lower Cottonwood service area. Under GRPP operation, water would be pumped from the Green River to the pond and flow by gravity to the Ouray Park Pipeline and to irrigated lands in the Cottonwood and Pelican Lake service areas. WSCCSP facilities would convey the Uintah River water that currently serves these lands to lands serviced by URIC and OPIC. Therefore, upon completion of GRPP, the operation of GRPP, the Ouray Park Canal, and the WSCCSP would be combined since successful exchanges of water are dependent on facilities from all three projects. A location map showing GRPP, Ouray Park Canal, and WSCCSP facilities, and the irrigation company service areas are shown in Figure 13

#### *2.3.3.1 Water Supply*

Water for the GRPP would be provided by Reclamation from Flaming Gorge Reservoir under terms of a Water Service Contract between the District and Reclamation. The Water Service Contract would grant the District the right to use up to 10,000 af of Colorado River Storage Project water per year from Flaming Gorge Reservoir for commercial agriculture purposes for a term of 5 years. The District has indicated its intent to seek a long term Water Service Contract for up to 10,000 af per year, for the maximum allowable contract period of 40 years.

Water would be released from Flaming Gorge Dam in accordance with the provisions of the FGEIS Record of Decision (ROD) and at the request of the District consistent with terms of the Water Service Contract. Reclamation can only release this water from Flaming Gorge Dam and cannot be responsible for losses or diversions of the water by others. Delivery of water within the river is a matter for the State Engineer's office. The maximum flow released for the GRPP at any time would be 53 cfs or approximately 1 to 2.5 percent of the average Green River flow of between 2,000 cfs and 5,000 cfs during June through August.

Review of the hydrology modeling performed for the FGEIS shows that flow and temperature recommendations implemented in accordance with the ROD would continue to be met while releasing water under the terms of the proposed 5 year Water Service Contract. Water quantities to be diverted are so small as to be insignificant relative to river stage.

#### *2.3.3.2 Water Demand*

As previously stated, water would be pumped through GRPP facilities from the Green River to OPIC lands in the Cottonwood and Pelican Lake areas (see Figure 13). Under GRPP operation, water that has historically been delivered to OPIC lands in the Cottonwood and Pelican Lake areas from the Uinta and Whiterocks Rivers would be delivered by exchange to the URIC service area and upper portions of OPIC's Brough and Cottonwood service areas. Also, the water that has historically been delivered from the high mountain lakes by the Whiterocks River to the Cottonwood service area would be delivered by exchange to the WIC service area. Therefore, GRPP would provide water directly to OPIC lands in the Cottonwood and Pelican Lake areas and by exchange to upper portions of OPIC's Brough and Cottonwood lands, URIC lands, and WIC lands.

The Proposed Project will be analyzed in two phases. The first (Initial Phase) is for delivery of up to 8,500 af per year to meet current requests for project water. The second (Full Project) phase is for delivery of up to 10,000 af per year to meet anticipated future requests for additional water. Current water subscriptions and average-year deliveries to each service area for the two phases are shown in Table 2.1. It is expected that additional requests received during the review of this EA will bring the initial phase up to the full capacity of 10,000 af per year soon after plant startup, therefore the temporary Water Service Contract is proposed to be for up to 10,000 af per year. Should these requests not in fact be made, the proposed Water Service Contract might be amended or rewritten to specify an upper limit of 8,500 af per year. Tables and analyses in this EA cover both possibilities.

**Table 2.1**
**Estimated Project Water Demand**

| **Service Area** | **Current Subscription** (acre-feet) | **Initial Phase** (acre-feet) | **Full Project** (acre-feet) |
|---|---|---|---|
| Lower Cottonwood | 2,132 | 2,200 | 2,400 |
| Pump to Pond | 1,071 | 1,100 | 1,400 |
| Brough | 2,274 | 2,300 | 2,685 |
| Upper Cottonwood | 647 | 650 | 750 |
| Pelican Lake | 179 | 200 | 515 |
| URIC | 1,497 | 1,550 | 1,750 |
| Whiterocks | 500 | 500 | 500 |
| **Total** | **8,300** | **8,500** | **10,000** |

Since GRPP deliveries consist of both "full service" water (to replace all existing water to OPIC's Lower Cottonwood service area) and "supplemental service" water (additional late season water to all shareholders), the monthly distribution pattern would be a combination of the two. The estimated GRPP water distribution pattern in two-week increments is shown in Table 2.2. Data and assumptions used to estimate the distribution pattern is shown in Appendix A.

**Table 2.2**
**Monthly Distribution Pattern**

| Period | Distribution (Percent) | Initial Phase (acre-feet) | Full Project (acre-feet) |
|---|---|---|---|
| April 15-30 | 2.8 | 238 | 280 |
| May 1-15 | 4.6 | 391 | 460 |
| May 16-31 | 6.5 | 553 | 650 |
| June 1-15 | 8.6 | 731 | 860 |
| June 16-30 | 10.0 | 850 | 1,000 |
| July 1-15 | 10.8 | 918 | 1,080 |
| July 16-31 | 11.3 | 960 | 1,130 |
| Aug 1-15 | 11.3 | 960 | 1,130 |
| Aug 16-31 | 10.6 | 901 | 1,060 |
| Sept 1-15 | 9.4 | 799 | 940 |
| Sept 16-30 | 8.0 | 680 | 800 |
| Oct 1-15 | 6.1 | 519 | 610 |
| **Total** | **100.0** | **8,500** | **10,000** |

Water deliveries to project participants shown in Table 2.1 would vary from year to year based on fluctuating hydrologic cycles. Typically, wet-year water deliveries would be less than average-year deliveries due to a reduced need for water. Also, dry-year deliveries are typically less than average-year deliveries due to a lack of water available to deliver. However, because GRPP would receive storage water from Flaming Gorge Reservoir under a Water Service Contract with Reclamation, the analysis assumes that there would be no reduction of water availability in dry years. Therefore, GRPP deliveries are expected to be constant during dry to average years and be reduced in wet years due to a lack of demand. Direct flow and storage water available from the Whiterocks and Uinta Rivers will be used prior to a call on GRPP supplies.

Estimated Project deliveries for the various hydrologic conditions are shown in Table 2.3 for the two phases of the GRPP. These numbers vary from year to year based on the annual water supply available from the Uinta River measured at the Uinta River near Neola USGS gaging station. Greater detail on how the numbers are estimated is shown in Appendix A.

**Table 2.3**
**Estimated Annual Water Demand Distribution**
**(Based on 1930 to 2000 flow record)**

| Water Year | River Flow[1] | 8,500 af/yr Scenario | 10,000 af/yr Scenario |
|---|---|---|---|
| Dry | 10% | 8500 | 10,000 |
| Average | 50% | 8500 | 10,000 |
| Moderately Wet | 60% | 8,000 | 9,400 |
| | 70% | 6,500 | 7,600 |
| | 80% | 4,400 | 5,200 |
| Wet | 90% | 0 - 2,400 | 0 – 2,800 |

[1] River flow percentages indicate the ranking the specific year is within the 1930 to 2000 historic flow range. For example, a dry year is the 10% year of the record, meaning flows during 10% of the years of record were equal to or less than the dry year.

#### *2.3.3.3 Pumping Plant and Pond Operations Analysis*

The pumping plant and pond system are designed to provide the flexibility to meet full irrigation demands while limiting pumping during peak power rate hours, minimizing pumping during times of greatest endangered fish larvae flow in the Green River, and limiting pump motor startup times to between 12:00 midnight and 4:00 am to minimize "flicker" impacts to neighboring power customers. The 30 acre-foot pond would store almost 7 hours of full three-pump capacity. The pump station is designed with three pumps for normal operation and a fourth for redundancy purposes. The three pumps can be turned on and off individually to meet the variable irrigation demands. This section describes the operations model used to analyze different pumping scenarios, the data and assumptions used in the model, and the results of the model. Additional data and backup tables are included in Appendix B.

**Operations Model**

A pumping plant and pond operations model was developed to analyze different operating scenarios and develop the most efficient operating plan. The model tracks pumping volume, irrigation demands, and pond operation for the entire operational period from April 15 to October 15 of each year. These hydrological variables are tracked hourly for typical operations each month, in order to determine how many pumps are operated at a time and how many hours a day (for each month) pumping operations would need to take place to meet demand. The hourly operations are then compared to the "blackout" hours requested by the District and the Service. The District's blackout hours are those with peak electrical power rates (avoided to reduce costs) and the Service's blackout hours are hours in which larval endangered fish are most abundant in the water column (avoided to reduce impacts to endangered fish).

The pump station is designed with three operating pumps and a fourth pump (if installed in the future) for use as a backup in the event one of the three pumps fails or is down for maintenance. The District intends to install all three pumps in the same construction contract. However, if construction bids exceed the project budget and the District is unable to secure additional funds, installation of the third pump may need to wait. Under this scenario, the pump station would be operated with two pumps during this interim period until the third is installed. Therefore, the following three operating scenarios are evaluated in the model:

1. Initial Phase (8,500 af/yr) Two pump scenario
2. Initial Phase (8,500 af/yr) Three pump scenario
3. Full Project (10,000 af/yr) Three-pump scenario

**Operating Criteria**

The purpose of the GRPP is to develop water for the supplemental irrigation of lands in western Uintah County in the most cost effective manner possible. Since energy costs make up the largest component of operating costs, every effort will be made to reduce energy costs. The project will also be operated to minimize impacts to the endangered fishes of the Green River. As such, the project will be operated according to the following rules and priorities:

1. Pump water at times and in the amounts necessary to meet project irrigation demands;
2. Start motors during early morning hours (12:00 am to 4:00 am) to avoid power "flicker" impacts to local power users;
3. Minimize pumping during peak power rate hours;
4. Minimize pumping during fish blackout hours; and
5. Operate with the least number of pumps at a time.

The GRPP would also operate conjunctively with the Uinta River System in order to maximize the use of existing direct flow and storage on the Uinta and Whiterocks Rivers and minimize the amount of water pumped from the Green River. Pumped Green River water, due in large part to its higher cost, would be the last source of water called upon by the irrigators.

A Supervisory Control and Data Acquisition (SCADA) system would be utilized to optimize the operation of the pump station and pond and to maximize the use of existing water rights on the Uinta and Whiterocks Rivers. This SCADA system would be tied to and become a part of the existing WSCCSP SCADA system. Storage and flow data from the Uinta and Whiterocks Rivers system would be transmitted to the SCADA system for use in operating the GRPP. Also, additional real-time larvae drift data would be provided by the Service to help optimize operations for the mutual benefit of Green River endangered fish and the water users. In summary, the SCADA system would allow remote operation of the pump station based on the real-time data provided from throughout the system.

**Peak Power Rate Hours**

Peak power rate hours used in the model were taken from a rate sheet provided by Moon Lake Electric Association, Inc, titled "Electric Service Schedule LP, Large Power Service", effective July 1, 2000. Hours of peak power rates are shown in Table 2.4. A copy of the rate sheet is attached as Appendix C.

**Table 2.4**
**Peak Power Rate Hours**

| Month | Hours of Peak Power Rates |
|---|---|
| April | 7 am – 11 am<br>6 pm – 11 pm |
| May | 7 pm – 11 pm |
| June | 7 pm – 11 pm |
| July | 2 pm – 11 pm |
| August | 2 pm – 11 pm |
| September | 7 am – 11 am<br>6 pm – 10 pm |
| October | 7 am – 11 am<br>6 pm – 10 pm |

**Endangered Fish Larvae Flow Hours**

Endangered larval fish are very small (<0.5 inches total length) and incapable of directed swimming from the time of hatching through the first 2-4 weeks of their life. Depending on the water year, larval fish may be present in the Green, Colorado, Gunnison, and Yampa Rivers from as early as April 1 to as late as August 31 (earlier in dry years; later in wet years). Larval endangered fish are the most susceptible to entrainment into pump intake structures because of their lack of swimming ability. The most effective way to minimize entrainment is for pumps to be turned off. However, this also has the largest impact on project operations.

Therefore, the Service asked researchers to determine what time of day larval fish are most abundant in the water column. Recent data analysis by the Colorado State University Larval Fish Lab indicated that the highest abundance of larval fish was found at midnight, by nearly an order of magnitude. As a result, the Service has requested that, if possible, pumps not operate during the midnight hours (10 pm to 2 am).

In an effort to minimize impacts to project operations, the Service has agreed to only request the pumps be turned off when the larval drift of Colorado pikeminnow and razorback sucker is known to be occurring (rather than a blanket period throughout the summer). Larval drift occurrence is provided by ongoing monitoring efforts conducted by the Upper Colorado River Endangered Fish Recovery Program (UCRRP), of which Reclamation is a partner. Each year on or before April 1, the District will request to be informed of the beginning and end of both the Colorado pikeminnow and razorback sucker larval drift periods. The

Service or the UCRRP will then provide this data to the District as soon as it is known.

Larval drift periods for the two species are highly variable in initiation date and duration. The periods may overlap, but most likely will not. Therefore, it is in the best interest of both the District and the Service to operate under real-time data. The District will operate the GRPP pumps to minimize pumping during larvae drift periods according to the operating criteria described above.

**Model Results**

Model results for each of the three scenarios are shown in Tables 2.5 through 2.7. The full model output is included in Appendix B. The tables show the anticipated hours the pumps would be operated during each two-week time increment from April 15 through October 15. The tables also indicate the number of pumps that would be operated during peak and off-peak hours and those blackout hours (peak power and fish larvae) that would be affected.

**Table 2.5**

**Green River Pumping Plant**

Pump Operation Hours

Initial Phase (8,500 af/yr) - Two Pump Option

| Date | AM | | | | | | | | | | | | PM | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| April 15-30 | | | | | | | | | | | | | | | | | | | | | | | | |
| May 1-15 | | | | | | | | | | | | | | | | | | | | | | | | |
| May 16-31 | | | | | | | | | | | | | | | | | | | | | | | | |
| June 1-15 | | | | | | | | | | | | | | | | | | | | | | | | |
| June 16-30 | | | | | | | | | | | | | | | | | | | | | | | | |
| July 1-15 | | | | | | | | | | | | | | | | | | | | | | | | |
| July 16-31 | | | | | | | | | | | | | | | | | | | | | | | | |
| Aug 1-15 | | | | | | | | | | | | | | | | | | | | | | | | |
| Aug 16-31 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sep 1-15 | | | | | | | | | | | | | | | | | | | | | | | | |
| Sep 16-30 | | | | | | | | | | | | | | | | | | | | | | | | |
| Oct 1-15 | | | | | | | | | | | | | | | | | | | | | | | | |

Fish Blackout Hours — Two Pumps

Peak Power Hours — One Pump

Peak Power & Fish Blackout Hour

**Table 2.6**

**Green River Pumping Plant**

Pump Operation Hours

Initial Phase (8,500 af/yr) - Three Pump Option

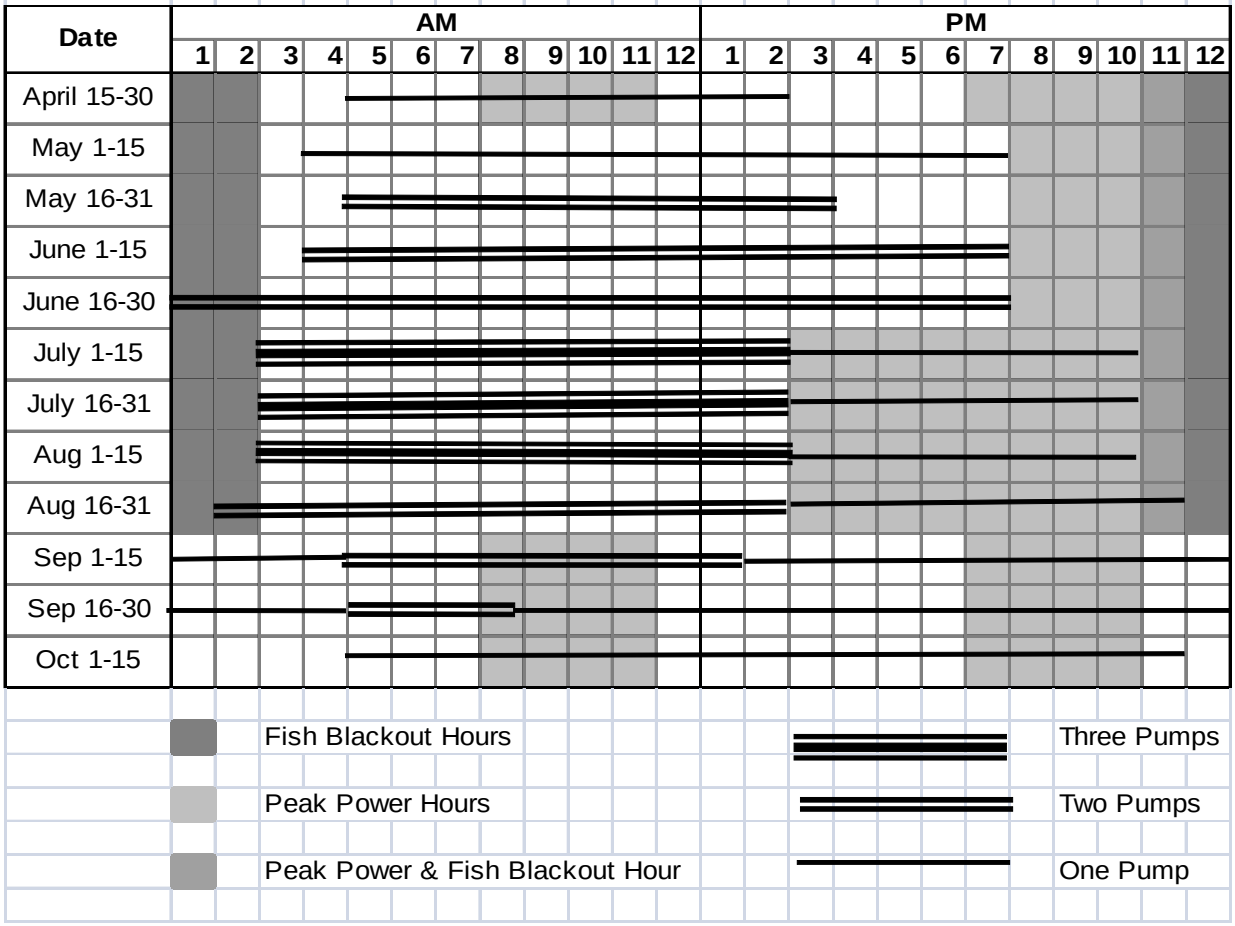
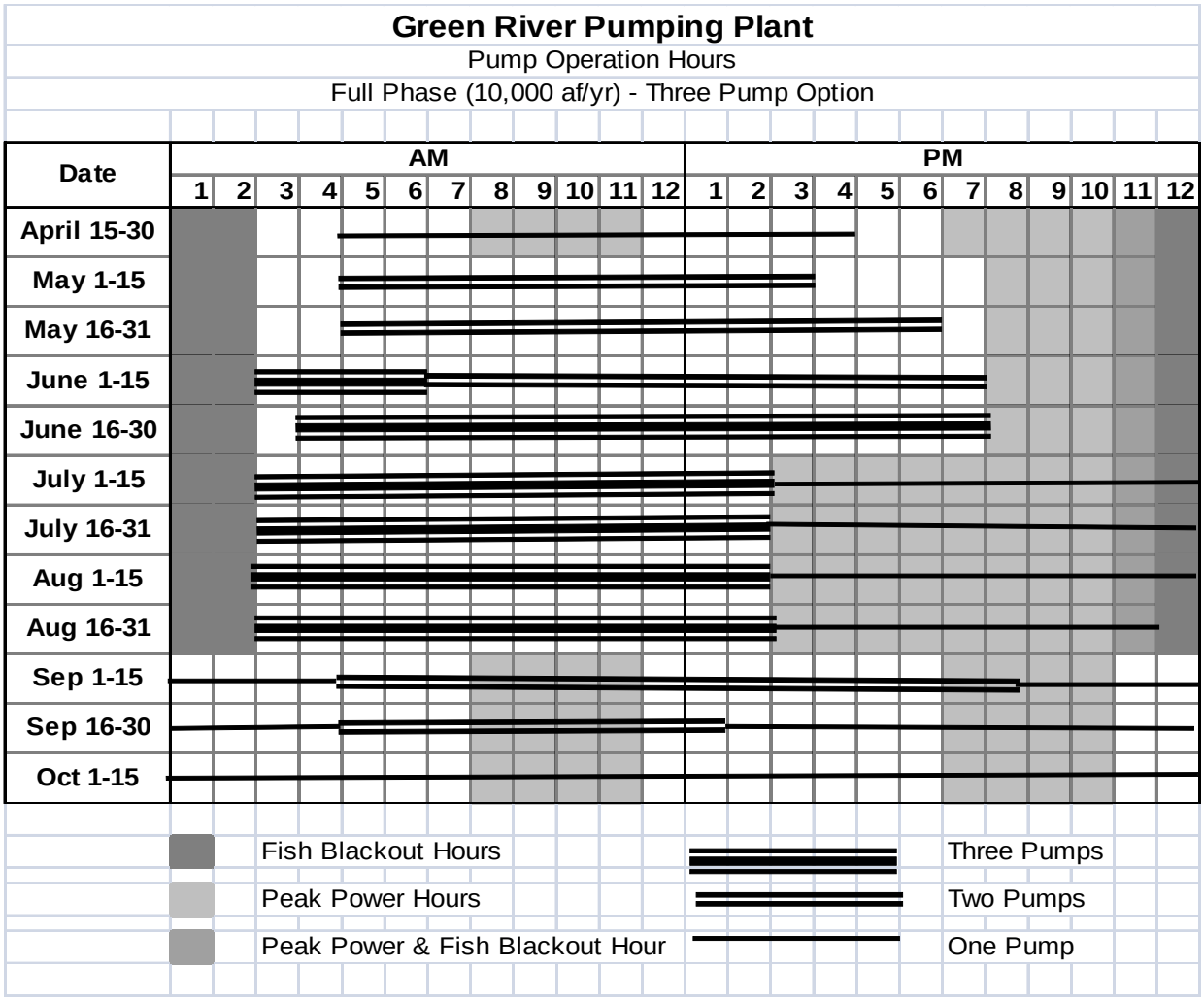


**Table 2.7**




### *2.3.3.4 Intake Approach Velocities Analysis*

As stated in Section 2.3.1 (Project Design), the fish screens are designed to comply with Service standards for minimizing take of juvenile fish during pumping operations. Current Service standards follow the 1997 National Marine Fisheries Service's 'Fish Screening for Anadromous Salmonids' which require fish screen mesh openings of no greater than 3/32-inch and approach velocities of no greater than 0.33 feet per second (fps). However, the primary concern of the Service is to have project approach velocities below the "sustained swimming speed" of juvenile Green River endangered fish, allowing these juvenile fish to escape the current created by the project.

Because reducing approach velocities for a project of this size has large economic impacts, the Service investigated whether allowing a minor variance above 0.33 fps would be possible. Therefore, the Service investigated swimming speeds of juvenile Green River endangered fish to determine the impact of allowing this variance. Research into swimming speeds was only available for Colorado

pikeminnow (Childs and Clarkson, 1996). However, for fish at this size, swimming speeds of other desert fish were considered to be similar. Swimming speeds of juvenile pikeminnow are affected by water temperature and size of the fish. Estimates are shown in Table 2.8 for fish approximately 20 mm in size.

**Table 2.8**
**Juvenile Colorado Pikeminnow Swim Speed**
**(Data based on Childs and Clarkson, 1996)**

| Water Temperature (Centigrade) | Mean FV[1](50) Fps | Mean Sustained Speed[2] fps | Low CI Sustained Speed[3] fps |
|---|---|---|---|
| 10 | 0.436 | 0.349 | 0.325 |
| 14 | 0.482 | 0.386 | 0.362 |
| 20 | 0.571 | 0.457 | 0.433 |

[1] Mean FV(50) is the mean velocity at which half of fish fail to maintain swimming over a period of thirty minutes
[2] Mean Sustained speed is computed at 80% of the mean FV(50)
[3] Low CI Sustained speed is computed as 80 % of the lower bounds of the 95% confidence interval around the mean FV(50)

Approach velocity varies with the cross sectional area of the water on the screens and the flow rate pumped. Approach velocity is computed as the flow rate pumped (20 cfs for one pump, 37 cfs for two pumps or 53 cfs for three pumps) divided by the intake area measured at 3-inches in front of the trash rack. The cross sectional area against the intake screens is reduced during dry years because the water surface elevation is below the top level of the intake screens. The velocity through this smaller screen area increases in order to deliver the required flow rate.

Estimated approach velocities for the April 15 through October 15 irrigation season for each of the three operation scenarios are shown in Tables 2.9 through 2.11. These approach velocities were computed for four different Green River flow hydrologic conditions: an extreme dry year (2% exceedence) a dry year (10% exceedence), an average year (50% exceedence) and a wet year (90% exceedence). The tables show the minimum and maximum approach velocities for each hydrologic condition and the number of hours per day each pump is operated. Exceedence of the 0.33 fps threshold only occurs when the third pump is operating. Additional tables and backup data are included as Appendix D.

## Table 2.9

**Green River Pumping Plant**

Initial Phase (8,500 af/yr) - Two Pumps

Intake Approach Velocities

Units: feet per second (fps)

| Period | 2% MDF | | 10% MDF | | 50% MDF | | 90% MDF | | Hr/day/pump | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max | Min | Max | 1 | 2 | 3 | T |
| Apr 16-30 | 0.112 | 0.131 | 0.107 | 0.124 | 0.085 | 0.103 | 0.067 | 0.077 | 10 | | | 10 |
| May 1-15 | 0.106 | 0.115 | 0.093 | 0.110 | 0.070 | 0.085 | 0.056 | 0.067 | 16 | | | 16 |
| May 16-31 | 0.171 | 0.206 | 0.161 | 0.172 | 0.117 | 0.133 | 0.096 | 0.108 | | 11 | | 11 |
| June 1-15 | 0.183 | 0.222 | 0.170 | 0.201 | 0.120 | 0.128 | 0.096 | 0.108 | | 16 | | 16 |
| June 16-30 | 0.224 | 0.278 | 0.204 | 0.254 | 0.129 | 0.157 | 0.102 | 0.124 | | 19 | | 19 |
| July 1-15 | 0.268 | 0.296 | 0.254 | 0.275 | 0.165 | 0.205 | 0.123 | 0.146 | | 21 | | 21 |
| July 16-31 | 0.296 | 0.305 | 0.276 | 0.291 | 0.207 | 0.234 | 0.149 | 0.191 | | 20 | | 20 |
| Aug 1-15 | 0.299 | 0.304 | 0.290 | 0.298 | 0.239 | 0.248 | 0.176 | 0.201 | | 20 | | 20 |
| Aug 16-31 | 0.302 | 0.306 | 0.295 | 0.300 | 0.242 | 0.256 | 0.194 | 0.214 | 9 | 13 | | 22 |
| Sept 1-15 | 0.302 | 0.311 | 0.297 | 0.303 | 0.249 | 0.258 | 0.202 | 0.221 | 15 | 9 | | 24 |
| Sept 16-30 | 0.293 | 0.311 | 0.200 | 0.297 | 0.248 | 0.258 | 0.200 | 0.217 | 20 | 4 | | 24 |
| Oct 1-15 | 0.159 | 0.163 | 0.150 | 0.158 | 0.129 | 0.136 | 0.105 | 0.112 | 19 | | | 19 |

Indicates exceedence of 0.33 fps threshold during third pump operation

## Table 2.10

**Green River Pumping Plant**

Initial Phase (8,500 af/yr) - Three Pumps

Intake Approach Velocities

Units: feet per second (fps)

| Period | 2% MDF | | 10% MDF | | 50% MDF | | 90% MDF | | Hr/day/pump | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max | Min | Max | 1 | 2 | 3 | T |
| Apr 16-30 | 0.112 | 0.131 | 0.107 | 0.124 | 0.085 | 0.103 | 0.067 | 0.077 | 10 | | | 10 |
| May 1-15 | 0.106 | 0.115 | 0.093 | 0.110 | 0.070 | 0.085 | 0.056 | 0.067 | 16 | | | 16 |
| May 16-31 | 0.171 | 0.206 | 0.161 | 0.172 | 0.117 | 0.133 | 0.096 | 0.108 | | 11 | | 11 |
| June 1-15 | 0.183 | 0.222 | 0.170 | 0.201 | 0.120 | 0.128 | 0.096 | 0.108 | | 16 | | 16 |
| June 16-30 | 0.224 | 0.278 | 0.204 | 0.254 | 0.129 | 0.157 | 0.102 | 0.124 | | 19 | | 19 |
| July 1-15 | 0.383 | 0.425 | 0.364 | 0.394 | 0.236 | 0.293 | 0.176 | 0.209 | 8 | | 12 | 20 |
| July 16-31 | 0.425 | 0.437 | 0.395 | 0.416 | 0.296 | 0.336 | 0.214 | 0.273 | 8 | | 12 | 20 |
| Aug 1-15 | 0.428 | 0.435 | 0.416 | 0.426 | 0.342 | 0.355 | 0.252 | 0.288 | 8 | | 12 | 20 |
| Aug 16-31 | 0.302 | 0.306 | 0.295 | 0.300 | 0.242 | 0.256 | 0.194 | 0.214 | 9 | 13 | | 22 |
| Sept 1-15 | 0.302 | 0.311 | 0.297 | 0.303 | 0.249 | 0.258 | 0.202 | 0.221 | 15 | 9 | | 24 |
| Sept 16-30 | 0.293 | 0.311 | 0.279 | 0.297 | 0.248 | 0.258 | 0.200 | 0.217 | 20 | 4 | | 24 |
| Oct 1-15 | 0.159 | 0.163 | 0.150 | 0.158 | 0.129 | 0.136 | 0.105 | 0.112 | 19 | | | 19 |

Indicates exceedence of 0.33 fps threshold during third pump operation

**Table 2.11**

**Green River Pumping Plant**

Full Project (10,000 af/yr) - Three Pumps

Intake Approach Velocities

Units: feet per second (fps)

| Period | 2% MDF | | 10% MDF | | 50% MDF | | 90% MDF | | Hr/day/pump | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max | Min | Max | 1 | 2 | 3 | T |
| Apr 16-30 | 0.112 | 0.131 | 0.107 | 0.124 | 0.085 | 0.103 | 0.067 | 0.077 | 12 | | | |
| May 1-15 | 0.196 | 0.213 | 0.172 | 0.203 | 0.130 | 0.158 | 0.104 | 0.124 | | 11 | | |
| May 16-31 | 0.171 | 0.206 | 0.161 | 0.172 | 0.117 | 0.133 | 0.096 | 0.108 | | 14 | | |
| June 1-15 | 0.263 | 0.319 | 0.243 | 0.288 | 0.172 | 0.183 | 0.137 | 0.154 | | 13 | 4 | 17 |
| June 16-30 | 0.320 | 0.398 | 0.293 | 0.364 | 0.185 | 0.225 | 0.146 | 0.177 | | | 16 | 16 |
| July 1-15 | 0.383 | 0.425 | 0.364 | 0.394 | 0.236 | 0.293 | 0.176 | 0.209 | 10 | | 12 | 22 |
| July 16-31 | 0.425 | 0.437 | 0.395 | 0.416 | 0.296 | 0.336 | 0.214 | 0.273 | 10 | | 12 | 22 |
| Aug 1-15 | 0.428 | 0.435 | 0.416 | 0.426 | 0.342 | 0.355 | 0.252 | 0.288 | 10 | | 12 | 22 |
| Aug 16-31 | 0.432 | 0.438 | 0.423 | 0.430 | 0.346 | 0.367 | 0.277 | 0.307 | 9 | | 12 | 21 |
| Sept 1-15 | 0.302 | 0.311 | 0.297 | 0.303 | 0.249 | 0.258 | 0.202 | 0.221 | 8 | 16 | | 24 |
| Sept 16-30 | 0.293 | 0.311 | 0.279 | 0.297 | 0.248 | 0.258 | 0.200 | 0.217 | 15 | 9 | | 24 |
| Oct 1-15 | 0.159 | 0.163 | 0.150 | 0.158 | 0.129 | 0.136 | 0.105 | 0.112 | 24 | | | 24 |

Indicates exceedence of 0.33 fps threshold during third pump operation

As noted in Tables 2.10 and 2.11, approach velocities exceed the 0.33 fps threshold when three pumps are operating during the peak water demand months of June through August of average to dry water years. Comparing fish swim speeds to approach velocities, however, indicate that these approach velocities are less than estimated swimming speeds for endangered fish during these times with only a few exceptions. The estimated swimming speeds for these times were calculated based on size of fish and expected water temperature in the Green River, because fish swim faster as they grow and in warmer water up to thermal niche boundaries. It should be noted that Childs and Clarkson (1996) did not investigate swimming speeds of juvenile fish above water temperatures of 20C. Without empirical data that allows extrapolation of swimming speeds above 20C, swim speeds are capped at 0.433fps (swimming speed seen at 20C). It is expected that swim speeds continue to improve above 20C because other research has demonstrated that larval and juvenile fish have water temperature tolerance limits up to 30C and have been characterized as having an optimal thermal niche of 25C (references in Lamarra 2007). Therefore, it is expected that juvenile fish swim speeds continue to rise as water temperatures increase above 20C which would eliminate all remaining instances of approach velocity exceedences shown in Table 2.12.

## Table 2.12

### Green River Pumping Plant

Three Pump Operation - Green River 2% MDF

Swim Speed/Intake Approach Velocity Comparison

| Day | June | | | July | | | August | | |
|---|---|---|---|---|---|---|---|---|---|
| | Average Temp Deg C | Swim Speed (fps) | Intake Vel (2%) (fps) | Average Temp Deg C | Swim Speed (fps) | Intake Vel (2%) (fps) | Average Temp Deg C | Swim Speed (fps) | Intake Vel (2%) (fps) |
| 1 | **16.32** | 0.388 | 0.263 | **22.20** | 0.433 | 0.383 | **23.90** | 0.433 | 0.431 |
| 2 | **16.59** | 0.391 | 0.267 | **22.36** | 0.433 | 0.385 | **23.80** | 0.433 | 0.430 |
| 3 | **16.68** | 0.392 | 0.268 | **22.30** | 0.433 | 0.391 | **23.74** | 0.433 | 0.428 |
| 4 | **16.72** | 0.393 | 0.273 | **22.52** | 0.433 | 0.402 | **23.59** | 0.433 | 0.428 |
| 5 | **16.89** | 0.395 | 0.277 | **22.59** | 0.433 | 0.406 | **23.65** | 0.433 | 0.428 |
| 6 | **16.91** | 0.395 | 0.281 | **22.80** | 0.433 | 0.410 | **23.60** | 0.433 | 0.428 |
| 7 | **16.88** | 0.395 | 0.283 | **22.80** | 0.433 | 0.414 | **23.53** | 0.433 | 0.430 |
| 8 | **16.92** | 0.395 | 0.291 | **23.23** | 0.433 | 0.417 | **23.50** | 0.433 | 0.430 |
| 9 | **16.99** | 0.396 | 0.293 | **23.06** | 0.433 | 0.418 | **23.56** | 0.433 | 0.430 |
| 10 | **17.12** | 0.397 | 0.291 | **23.17** | 0.433 | 0.418 | **23.22** | 0.433 | 0.432 |
| 11 | **17.47** | 0.402 | 0.295 | **23.54** | 0.433 | 0.421 | **23.31** | 0.433 | 0.432 |
| 12 | **17.63** | 0.404 | 0.301 | **23.54** | 0.433 | 0.422 | **23.35** | 0.433 | 0.432 |
| 13 | **17.73** | 0.405 | 0.308 | **23.70** | 0.433 | 0.422 | **23.45** | 0.433 | 0.434 |
| 14 | **17.93** | 0.407 | 0.314 | **23.82** | 0.433 | 0.425 | **23.27** | 0.433 | 0.434 |
| 15 | **18.27** | 0.411 | 0.319 | **23.81** | 0.433 | 0.425 | **23.04** | 0.433 | 0.435 |
| 16 | **18.44** | 0.414 | 0.320 | **23.78** | 0.433 | 0.426 | **22.79** | 0.433 | 0.304 |
| 17 | **18.52** | 0.415 | 0.325 | **23.79** | 0.433 | 0.425 | **22.75** | 0.433 | 0.302 |
| 18 | **18.70** | 0.417 | 0.333 | **23.93** | 0.433 | 0.425 | **22.66** | 0.433 | 0.303 |
| 19 | **18.99** | 0.421 | 0.343 | **24.28** | 0.433 | 0.428 | **22.63** | 0.433 | 0.303 |
| 20 | **19.38** | 0.426 | 0.348 | **24.29** | 0.433 | 0.431 | **22.80** | 0.433 | 0.303 |
| 21 | **19.66** | 0.429 | 0.355 | **24.53** | 0.433 | 0.434 | **22.81** | 0.433 | 0.303 |
| 22 | **20.06** | 0.433 | 0.357 | **24.58** | 0.433 | 0.437 | **22.71** | 0.433 | 0.304 |
| 23 | **20.41** | 0.433 | 0.357 | **24.19** | 0.433 | 0.426 | **22.57** | 0.433 | 0.305 |
| 24 | **20.65** | 0.433 | 0.362 | **24.24** | 0.433 | 0.437 | **22.56** | 0.433 | 0.304 |
| 25 | **20.84** | 0.433 | 0.365 | **24.29** | 0.433 | 0.437 | **22.53** | 0.433 | 0.305 |
| 26 | **20.90** | 0.433 | 0.369 | **24.05** | 0.433 | 0.437 | **22.44** | 0.433 | 0.306 |
| 27 | **20.99** | 0.433 | 0.370 | **24.01** | 0.433 | 0.430 | **22.02** | 0.433 | 0.306 |
| 28 | **21.41** | 0.433 | 0.392 | **24.12** | 0.433 | 0.428 | **22.11** | 0.433 | 0.306 |
| 29 | **21.85** | 0.433 | 0.398 | **24.34** | 0.433 | 0.429 | **22.37** | 0.433 | 0.304 |
| 30 | **22.10** | 0.433 | 0.377 | **24.29** | 0.433 | 0.431 | **22.24** | 0.433 | 0.305 |
| 31 | | | | **24.05** | 0.433 | 0.431 | **21.85** | 0.433 | 0.302 |
| Notes: | | | | | | | | | |
| 1. Temperatures taken from Green River at Ouray Refuge USGS Gage (1991 to 2009 average) | | | | | | | | | |

| |
|---|
| 2. Swimming speeds are calculated based on a regression fit to data points from "Temperature Effects of Swimming Performance or Larvae and Juvenile Colorado Squawfish; Implications for Survival and Species Recovery (Childs and Clarkson, 1986). The regression uses temperature data from the Ouray gage. |
| 3. Intake Velocity for 2% Mean Daily Flow (MDF) Green River at the Jensen Gage |
| 4. Shaded areas indicate swim speed exceedence |

#### *2.3.3.5 Green River Elevation Analysis*

Water would be released from Flaming Gorge Dam at the request of the District consistent with terms of the GRPP Water Service Agreement and the flow recommendations and other Reclamation operating criteria for Flaming Gorge Reservoir. The maximum flow diverted by the GRPP at any time would be 53 cfs or approximately 1 to 2.5 percent of the average Green River flow (2,000 cfs to 5,000 cfs) during June through August. Impacts to the Green River water surface elevation would be negligible. Computation tables to show maximum Green River elevation changes as a result of GRPP operation are attached as Appendix E.

# Chapter 3 – Affected Environment and Environmental Effects

## 3.1 Introduction

This chapter describes the environment affected by the Proposed Action. These impacts are discussed under the following randomly ordered resource issues: recreation; water rights; water resources; water quality; public safety, access, and transportation; visual resources; socioeconomics; cultural resources; paleontological resources; wetlands and vegetation; wildlife resources; and threatened, endangered, and sensitive species. The present condition or characteristics of each resource is discussed first, followed by a discussion of the predicted impacts caused by the Proposed Action. The environmental effects are summarized in Table 3.1 at the end of this chapter.

## 3.2 Affected Environment

### 3.2.1 Recreation

The closest recreation area to the GRPP is Pelican Lake, over two miles to the west. This rather small BLM facility has its visitors coming from the west and north, with no reason to even drive by the proposed site within, mainly, private land holdings. The Green River within the proposed project area receives some rafting activity.

### 3.2.2 Water Rights

Water deliveries for the GRPP would either occur solely from project water releases from Flaming Gorge reservoir or would occur under a combination of project water releases and water rights held by UWCD. Project Water releases from Flaming Gorge are made under Application to Appropriate No. A30414, Water Right No. (41-2963). This appropriation allows Reclamation to store water in Flaming Gorge reservoir under an August 7, 1958 priority date and use that water for the authorized uses of the 1956 Colorado River Storage Project Action.

The UWCD water right that may be used in conjunction with the project water is a segregated portions of the Flaming Gorge water right, Application to Appropriate No. A30414. This appropriation originally included both the storage of water in Flaming Gorge Reservoir and the beneficial use thereof for the "Ultimate Phase" of the Central Utah Project. After the "Ultimate Phase" was deauthorized, Reclamation assigned this portion of the appropriation to the Utah

Board of Water Resources under a March 12, 1996 agreement. This agreement reserved for the United States the right to divert, store, and use water from Flaming Gorge Reservoir under Water Right No. 41-2963 (A30414) and further specified "The State of Utah agrees that if it stores water in or benefits directly from Colorado River Storage Project Facilities, the State of Utah will enter into a Water Service Contract with the United States."

The Utah Board of Water Resources has segregated and transferred to the District Water Right No. 41-3487 (A30414db) for 8,400 af and Water Right No. 41-3523 (A30414do) for 43,400 af from the "Ultimate Phase" water right. On August 11, 2009 the District segregated 8,500 af (Water Right No. 43-12263) off of Water Right No. 41-3523 and filed Change Application No. a35811 to move this water to the GRPP. This change application was advertised by the State Engineer in August 2009 and wasn't protested.

The GRPP would develop up to 10,000 af/year of irrigation water within the Colorado River basin. Depending on the location, crops, irrigation methods, and other factors this irrigation water could deplete up to anywhere between 60 to 100% of the 10,000 af annually. Depletion to the Colorado River for the 8,500 af/yr initial phase development was estimated to be approximately 6,500 af/yr. Depletion for the 10,000 af/yr full development phase is estimated at 7,500 af/yr. This depletion would be accounted as part of Utah's 23% share of the water available to the upper basin states under of the Upper Basin Colorado River Compact. According to current hydrological studies, it is estimated that on average 1.369 million af of annual depletion would be available to Utah.

Water diversions under Flaming Gorge reservoir and the GRPP would be regulated by underlying water right priority dates to protect neighboring water users on the Green River and in the Colorado River Basin. To protect the downstream water users (or keep Utah within it allocated compact allotment) the GRPP diversions would be cut off when there was insufficient water to satisfy all senior water rights senior to the priority date of the segregated "Ultimate Phase" right. To protect local water users on the Green River, the diversions could be cut off when they interfered with water rights that were senior to the priority of the change application that moved water to the pumping plant.

Under the Proposed Action, a Water Service Contract would be enacted that would allow the GRPP and its water rights to benefit from the stored water in the Flaming Gorge reservoir. The Water Service Contract could provide project water that is stored in Flaming Gorge Reservoir to the GRPP when the UWCD water rights are out of priority or in conflict with instream flow requirements.

### 3.2.3 Water Resources

This analysis is tiered from the FGEIS Section 3.3 (page 49) Water Resources and Hydrology along with the Hydrologic Modeling section contained in Appendix 2. Water would be released from Flaming Gorge Dam in accordance with the provisions of the ROD and at the request of the District consistent with terms of

the Water Service Contract. Compliance with the ROD includes "maintaining all authorized purposes of the Flaming Gorge Unit of the Colorado River Storage Project (CRSP), including those related to the development of water resources in accordance with the Colorado River Compact." The Proposed Action Alternative is the first Water Service Contract issued under Water Right No. 41-2963 (A30414) as part of Utah's portion of its Compact Apportionment and is in compliance with the ROD.

### 3.2.4 Water Quality

The water in the project area is of good quality for agricultural and irrigation purposes and is primarily a calcium / sodium sulfate water. This is indicative of waters that flow through marine shale derived soils. In the project area the total dissolved solids (TDS) or salts are less in the Green River waters than those found in the Uinta River. Also due to the geology of the area, marine shale derived soils, there are measurable amounts of arsenic, boron and selenium in the water; however, those levels are not high enough to be of concern for agricultural purposes.

The constituents in the Green River water below the project area (Green River near Ouray) are not significantly greater than the water found above the project area (Green River near Jensen). This data is from fairly sporadic data at the Ouray USGS gauge, but it appears that there is not a great amount of salt returning to the Green River in any return flow from these irrigated lands.

The existing Nielson Pump Station would be removed and that site would be re-contoured and re-seeded to natural conditions. The station currently is in poor habitat condition with mostly weed species present in the area. The facility itself has experienced erosional degradation and is in jeopardy of failure.

### 3.2.5 Public Safety, Access, and Transportation

The nearest major town to the project site is Vernal City located about 35 miles to the north-east of the site. Roosevelt City is about 35 miles to the north-west. The town of Ouray is about 8 miles south of the site and the town of Randlett is about 8 miles to the west. Primary access to the site is on U.S. Hwy 40 either from Roosevelt or Vernal to the intersection of U.S. Hwy 40 and Utah Hwy 88, then approximately 8 miles south on Hwy 88, then approximately 2 miles on a county paved road and the remaining approximately two miles on a gravel road.

During construction, it is estimated that approximately 10 to 15 vehicles per day would travel to the site. The majority of these vehicle trips would be for transporting contractor employees to the site. Some concrete trucks and large equipment transport vehicles would deliver construction materials to the site. Upon completion of construction, vehicle trips are expected to be reduced to no more than two per day for operation and maintenance purposes.

### 3.2.6 Visual Resources

The visual resource of the area would be of a rural setting with an abundance of irrigated crops, fences, and dirt access roads for farm equipment. The river corridor appears in a general natural state, with a gentle flow and appropriate riparian vegetation.

### 3.2.7 Socioeconomics

The proposed Green River Pumping Plant would provide a needed water supply to customers of the Uintah Water Conservancy District. In the short term, up to 10,000 acre-feet of water from Flaming Gorge has been requested to temporarily meet the needs of the District. It is the intent of the District to negotiate a long-term contract for 40 years with the United States in the amount of 10,000 acre-feet. This water will be used for supplemental irrigation of pasture grasses, alfalfa, and grains.

### 3.2.8 Cultural Resources

Cultural resources are defined as physical or other expressions of human activity or occupation. Such resources include culturally significant landscapes, prehistoric and historic archaeological sites as well as isolated artifacts or features, traditional cultural properties, Native American and other sacred places, and artifacts and documents of cultural and historic significance.

Section 106 of the National Historic Preservation Act (NHPA) of 1966, mandates that Reclamation take into account the potential effects of a proposed Federal undertaking on historic properties. Historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for, inclusion in the National Register of Historic Places (NRHP). Potential effects of the described alternatives on historic properties are the primary focus of this analysis.

The affected environment for cultural resources is identified as the APE (area of potential effects), in compliance with the regulations to Section 106 of the NHPA (36 CFR 800.16). The APE is defined as the geographic area within which Federal actions may directly or indirectly cause alterations in the character or use of historic properties. The APE for this proposed action includes the area of potential ground disturbance associated with the proposed pump station.

#### *3.2.8.1 Cultural Resources Status*

A Class I literature review and a Class III cultural resource inventory were completed for the APE, defined in the action alternative and analyzed for the proposed action, by Reclamation's Provo Area Office archeologist in October, 2009. A total of 1.8 acres were inventoried during the Class III inventory to determine if the proposed action would affect cultural resources. No cultural resources were identified as a result of the inventory.

In compliance with 36 CFR 800.4(d) (1) and 36 CFR 800.11(d), a copy of the cultural resource inventory report and a determination of no historic properties affected have been submitted to the Utah State Historic Preservation Office (SHPO) and Native American tribes which may attach religious or cultural significance to historic properties possibly affected by the proposed action for consultation.

### 3.2.9 Paleontological Resources

A paleontological file search was conducted in January 2010 for the project APE by the Utah Geological Survey (UGS). Martha Hayden, Paleontological Assistant with the UGS, was consulted regarding the potential for encountering previously documented and presently unknown paleontological resources in the vicinity of the project APE. The UGS reply dated January 26, 2010, stated that there are no previously recorded paleontological localities in the project area. Quaternary and Recent alluvial deposits that are exposed in the project APE have a low potential for yielding significant fossil localities. There may also be exposures of the Eocene Uinta Formation that have the potential for yielding significant vertebrate fossil localities.

### 3.2.10 Wetlands and Vegetation

The proposed pumping station exists entirely within the riparian area adjacent to the Green River. Vegetation consists mostly of tamarisk (*Tamarix ramosissima*), Russian olive (*Elaeagnus angustifolia*) cottonwood (*Populus Angustifolia*), and willow (*Salix spp*) with a weedy understory of Canada thistle (*Cirsium arvense*), whitetop (*Cardaria draba*), kochia (*Kochia scoparia*), cocklebur (*Xanthium strumarium*), and povertyweed (*Monolepis nuttalliana*). Other species comprising the understory include horsetail (*Equisetum arvense*), scouringrush (*Equisetum hyemale*), and saltgrass (*Distichlis spicata*).

Vegetation at the Nielson Station is similar to the proposed pump station location. The Nielson station would be removed and re-vegetated with native species under the Proposed Action.

A wetland delineation study was completed in the proposed pumping station location and a total of 1.68 acres of wetlands are within the project area. Located within the banks of the Green River, these wetlands have drainage connections to the Green River and therefore would be jurisdictional in nature and regulated by the US Army Corps of Engineers (USACE) under Section 404 of the CWA. According to the USACE Colorado West Regulatory Branch, the proposed action (except for the temporary cofferdam) would be exempted under the Farm or Stock Pond or Irrigation Ditch Construction or Maintenance and by the Farm, Forest or Temporary Mining Roads exemptions under Section 404 of the CWA.

### 3.2.11 Wildlife Resources

Wildlife resources within the general area of the Proposed Project include fish, big game, smaller mammals, raptors, water birds, and upland game birds, with a variety of other birds, reptiles, and amphibians. These are discussed below.

**Fish**
Twelve native fish species have been reported from reaches of the mainstem of the Green River between Flaming Gorge Dam and the Colorado River confluence and from lower portions of the river's tributaries. This assemblage of fishes includes warm-water species that prefer or require large-river habitats like the razorback sucker and Colorado pikeminnow (These are endangered species discussed in section 3.2.12 below), species that prefer cool- or cold-water streams or smaller river channels (e.g., Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*), mountain whitefish (*Prosopium williamsoni*), and mottled sculpin(*Cottus bairdii*)), and species with more generalized habitat requirements (e.g., roundtail chub (*Gila robusta*), speckled dace (*Rhinichthys osculus*), and bluehead sucker (*Catostomus discobolus*)).

Nonnative fishes dominate fish communities of the Colorado River Basin. Twenty-five nonnative fish species are found from the Green River between Flaming Gorge Dam and the Colorado River confluence. The red shiner (*Cyprinella lutrensis*), common carp (*Cyprinus carpio*), sand shiner (*Notropis stramineus*), fathead minnow (*Pimephales promelas*), channel catfish (*Ictalurus punctatus*), and smallmouth bass (*Micropterus dolomieu*) are widespread and common. Northern pike (*Esox lucius*) and green sunfish (*Lepomis cyanellus*) are present as well. Salmonids are abundant in the tailwaters of Flaming Gorge Dam.

**Big Game**
This area provides big game habitat for both summer and winter use areas for mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus nelsoni*). Deer and elk are seen wintering in the general area. Moose (*Alces alces*) are occasionally observed along the river and stream drainages. Mountain lion (*Felis concolor*) and black bear (*Ursus americanus*) are rare in the area.

**Smaller Mammals**
Other mammals common within the area include yellow-bellied marmot *(Marmota plaviventris*), badger (*Tasidea taxus*), least chipmunk (*Eutamias minimus*), golden-mantled ground squirrel (*Spermophilus lateralis*), meadow vole (*Microtus montanus*), northern pocket gopher (*Thomomys talpoides*), deer mouse (*Peromyscus maniculatus*), porcupine *(Erethizon dorsatum*), coyote (*Canis latrans*), raccoons (*Procyon lotor*), and striped skunk (*Mephitis mephitis*). Furbearers such as beaver (*Castor canadensis*), mink (*Mustela vison*), and muskrat (*Ondatra zibethicus*) use the wetland and riparian habitats and embankments of the river.

**Raptors**
Birds of prey, or raptors, have been observed within or adjacent to the project area. Cottonwood trees along rivers provide nesting habitat for raptors such as the golden eagle (*Aquila chrysaetos*), and red-tailed hawk (*Buteo jamaicensis*) and roosting sites for the great horned owl (*Bubo virginianus*). Golden eagles likely roost in the vicinity of the Proposed Project. Winter months are the best time to

view bald eagles in the area. Other raptors observed in the area are the American kestrel (*Falco sparverius*), sharp-shinned hawk (*Accipter striatus*), northern harrier (*Circus cyaneus*), and turkey vulture (*Cathartes aura*).

**Water Birds**

Numerous water birds occur in the project area such as waterfowl, shore birds, and other wading birds typically associated with wetlands and open water. The area provides important forage and cover sites for waterfowl and wading birds.

Waterfowl species common to the project area include Canada goose (*Branta Canadensis*), mallard (*Anas platyrhynchos*), common merganser (*Mergus merganser*), gadwall (*Anus strepera*), green-winged teal (*Anus crecca*), and redhead (*Anthya Americana*). In addition to these species, American widgeon (*Anus Americana*), common goldeneye (*Bucephala clangula*), and American coot (*Fulica americana*) are common during migration or winter. Great blue heron (*Ardea herodias*), spotted sandpiper (*Actitis macularia*), and killdeer (*Charadrius vociferous*) forage along shoreline and riparian habitats during the breeding season.

Other birds using this area include the pied-billed grebe (*Podilymbus podiceps*), eared grebe (*Podiceps nigricollis*), western grebe (*Aechmophorus occidentalis*), Clark's grebes *(Aechmorphorus clarkia*), double-crested cormorant (*Phalacrocorax auritus*), snowy egret (*Egretta thula*), black-crowned night-heron (*Nycticorax nycticorax*), white-faced ibis (*Plegadis chihi*), American bittern (*Botaurus lentiginosus*), northern pintail (*Anus acuta*), ruddy duck (*Oxyura jamaicensis*), Virginia rail (*Rallus limicola*), black-necked stilt (*Himantopus mexicanus*), American avocet (*Recurvirostra Americana*), Wilson's phalarope (*Phalaropus tricolor*), Forster's tern (*Sterna forsteri*), black tern (*Chlidonias niger*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*Tringa flavipes*), cinnamon teal (*Anus cyanoptera*), and willet (*Catoptrophorus semipalmatus*). During migration, these species of birds and many others visit the Ouray National Wildlife Refuge and other wetlands, along with occasional flocks of sandhill cranes (*Grus canadensis*).

**Upland Game Birds**

Upland game birds occurring in the project area include the ring-necked pheasant *(Phasianus colchicus*), and mourning dove (*Zenaida macroura*). California quail (*Lophortyx californicus*) may also use the area.

**Other Birds**

The most common birds are songbirds and similar species associated with terrestrial habitats. These species include sparrows, warblers, thrushes, vireos, swallows, blackbirds, woodpeckers, and hummingbirds. Another group of birds frequently observed are the corvids, including jays (*Cyanocitta spp*.), the black-billed magpie (*Pica pica*), and the common raven (*Corvus corax*).

**Reptiles and Amphibians**

A number of reptiles occur in the general area including the wandering garter snake (*Thamnophis elegans*), Great Basin gopher snake (*Pituophis catenifer*), and Great Basin rattlesnake (*Crotalus viridis*). The tiger salamander (*Ambystoma*

*tigrinum*), boreal chorus frog (*Pseudacris triseriata*), and leopard frog (*Rana pipiens*), may also occur in the area.

### 3.2.12 Threatened, Endangered, and Sensitive Species

Federal agencies are required to ensure that any action federally authorized, funded, or carried out would not adversely affect a federally listed threatened or endangered species. The four Colorado River endangered fish species listed below occur in the area of the Proposed Project.

Threatened (T), Endangered (E), and Candidate (C) species in Uintah County include:

| Status | Common Name | Biological Name |
|---|---|---|
| Fish | | |
| E | bonytail | *Gila elegans* |
| E | Colorado pikeminnow | *Ptychocheilus lucius* |
| E | humpback chub | *Gila cypha* |
| E | razorback sucker | *Xyrauchen texanus* |
| Animal | | |
| E[1] | black-footed Ferret | *Mustela nigripes* |
| T | Canada lynx | *Lynx canadensis* |
| T | Mexican spotted owl | *Strix occidentalis* |
| C | yellow billed cuckoo | *Coccyzus americanus* |
| Plant | | |
| T | clay reed-mustard | *Schoenocrambe argillacea* |
| E | shrubby reed-mustard | *Schoenocrambe suffrutescens* |
| T | Uinta Basin hookless cactus | *Sclerocactus glaucuc* |
| T | Pariette cactus | *Scler cactus brivispinus* |
| T | Ute ladies'-tresses | *Spiranthes diluvialis* |
| C | White River penstemon | *Penstemon scariosus var albifuvis* |

[1] Experimental

River reaches that have been designated as critical habitat for the bonytail in the Green River extend from the confluence with the Yampa River downstream to the boundary of Dinosaur National Monument and Desolation and Gray Canyons. In addition, critical habitat has been designated in the Yampa River from the upstream boundary of Dinosaur National Monument to its confluence with the Green River.

Critical habitat designated for Colorado pikeminnow in the Green River system includes the Yampa River from Craig, Colorado, downstream to the Green River; the Green River downstream of the Yampa River to the confluence with the

Colorado River; and the White River from Rio Blanco Reservoir downstream to the Green River.

Critical habitat for humpback chub in the Green River system includes the Yampa River within Dinosaur National Monument, Green River from its confluence with the Yampa River downstream to the southern boundary of Dinosaur National Monument, and the Green River within Desolation and Gray Canyons.

River reaches of critical habitat for razorback sucker in the Green River system include the lower Yampa River from the mouth of Cross Mountain Canyon to the confluence with the Green River), the Green River between the confluences of the Yampa and Colorado Rivers, the lower 18 miles of the White River, and the lower 2.5 miles of the Duchesne River.

The GRPP would be located downstream of both nursery and spawning habitat of federally listed Colorado River Endangered species. Therefore, fish less than 60 mm in length (such as age 1 fish) are expected to be present. Entrainment of all life stages of these endangered species are a concern with water pumps in this section of the river. However, the primary concern with pumps are young-of-year and larval fish age classes.

The black-footed ferret, Canada lynx and Mexican spotted owl exist within Uintah County but are not known to occur in the project area.

The Western Yellow-billed Cuckoo is known to occur along the riparian corridor of the Green River. A currently existing population of nesting cuckoos exists on the opposite side (southeast) of the river from the proposed GRPP. Historically, these birds nested on both sides of the river in the vicinity of the project.

None of the plant species listed above are known to occur in the project area.

The bald eagle is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. It is a winter resident of the area. This species roosts primarily in forested canyons or tall cottonwoods along streams and reservoirs. There are no known nesting pairs at or near the project area.

The following is a list of species of special concern, as defined by the State of Utah that may occur within the project area and are managed under Conservation Agreements.

| **Common Name** | **Biological Name** |
|---|---|
| Colorado River Cutthroat Trout | *Oncorhynchus clarkii pleuriticus* |
| Bluehead sucker | *Catostomus discobolus* |
| Flannelmouth sucker | *Catostomus latipinnis* |
| Roundtail chub | *Gila robusta* |
| Northern goshawk | *Accipiter gentilis* |

The fish species listed above have similar concerns as the Colorado River endangered fish species discussed above; namely, the entrainment of young-of-year and larval fish age classes.

Leopard frog (*Rana pipiens*) has been petitioned for listing under the ESA and may occur in the project area.

**Colorado River Endangered Species Recovery Implementation Program**
The purpose of the Colorado River Recovery Implementation Program (Recovery Program) is to recover Colorado River endangered fish while also providing for future water development for human use.

To help accomplish this, Recovery Program managers have developed an agreement clarifying how the Service will apply section 7 of the Endangered Species Act to water development projects in the upper Colorado River Basin. Section 7 of the Endangered Species Act requires Federal agencies to consult with the Service on actions that are likely to jeopardize the continued existence of endangered or threatened species or result in destruction or adverse modification of their critical habitat.

Since 1988, this approach has allowed the Service to issue favorable biological opinions on some 600 water projects in Colorado, Utah, and Wyoming with a potential to use more than 618,000 af of water.

Under this agreement, as long as sufficient progress is being made toward endangered fish recovery, the Service will issue favorable biological opinions on water depletions of less than 4,500 af of water. When reviewing projects that deplete more than 4,500 af of water per year, the Service determines on a case-by-case basis reasonable and prudent measures (RPMs) to minimize impacts from proposed projects. These RPMs are issued within biological opinions.

## 3.3 Environmental Effects

The proposed action is a Water Service Contract between Reclamation and the District for up to 10,000 af per year, for a period not to exceed 5 years. However, the District intends to request a 40 year Water Service Contract for up to 10,000 af per year. Therefore, environmental effects from this project at full capacity for 45 years must be analyzed.

Also, even though the full 10,000 af/yr water supply may not be delivered every year, wet and dry years included (see Table 3), the environmental effects will be analyzed as if it were delivered each year.

### 3.3.1 Recreation

#### *3.3.1.1 No Action Alternative*

The No Action Alternative would have no effect on recreational resources.

#### *3.3.1.2 Proposed Action Alternative*

The construction impacts of this project will not adversely impact recreation. The amount of water extracted from the Green River each year (up to 10,000 af) will not be noticed by recreationists.

### 3.3.2 Water Rights

#### *3.3.2.1 No Action Alternative*

Under the No Action Alternative, the GRPP would not be built and there would be no diversion of Green River water. This would have no effect on water rights.

#### *3.3.2.2 Proposed Action Alternative*

Under the Proposed Action, the GRPP would be able to call for and use stored Flaming Gorge Reservoir water when its water rights were being curtailed. The stored water available to the GRPP would protect the senior water rights and would not affect instream flow obligations in the Green River.

GRPP diversions will be regulated by the Utah State Engineer in accordance with the priority dates of the pumping plant's water rights and change applications to ensure that senior water rights are protected.

### 3.3.3 Water Resources

#### *3.3.3.1 No Action Alternative*

The no Action Alternative would have no effect on water resources in the Green River.

#### *3.3.3.2 Proposed Action Alternative*

There is sufficient unsubscribed water in Flaming Gorge Reservoir to meet the District's request. Also, the District has sufficient water rights to cover the request. The current site-specific project of 10,000 af per year equates to a maximum of 53 cfs being diverted out of the Green River at any time. This amount of diversion is within USGS gauge error of ±5% as measured at the Jensen, Utah USGS stream gauge. Flaming Gorge operations under the FGEIS ROD currently release enough water and the amount of diversion and depletion is of such a small amount that the Proposed Action would have no effect on water resources.

The Proposed Action Alternative would improve the agricultural water supply to lands in the project area. The additional water, up to one acre-foot per acre GRPP supply, would eliminate shortages in all years except moderate to extreme dry years.

The proposed project would have no effect on operations under the FGEIS ROD.

### 3.3.4 Water Quality

#### *3.3.4.1 No Action Alternative*

The No Action Alternative would have no effects on water quality.

#### *3.3.4.2 Proposed Action Alternative*

Some increased sediment / turbidity would be seen during the construction of the pumping plant and removal of the old pump site, but this would be of short term with minor impact to the river system.

There would be some increased sediment and therefore turbidity issues when the sheet piles and coffer dam are installed into the river around the new pump site. This would be temporary, during the installation and then removal of the coffer dam and temporary sheet piles, and most likely cause a minimal amount of increased sediment entering into the river system with no long term effect .

The removal, revegetation, and rehabilitation of the Nielson Station would eliminate the potential for possible leaks of contaminants into the Green River and reduce the erosion that is currently occurring.

Bank hardening caused by the installation of the sheet piles to protect the proposed GRPP has the potential for altering erosion patterns of the Green River immediately downstream of the pump site. The need for additional bank protection downstream of the pump site will be monitored by the District and installed at a later date if needed.

With the use of heavy equipment there is always a possibility of fuel spillage when refueling, so refueling shall be done outside of any riverine or riparian areas and be done in a contained area. Hydraulic oil may potentially be spilled also, however, the equipment and work being done should be isolated from the Green River, so that if there is any spillage from equipment it would easily be contained and cleaned up. Moving electrical transformers may also potentially allow for spillage of the oil inside the transformer, but again any spillage should be away from the river, allowing for an isolated event which could be cleaned up with minimal environmental contamination.

The addition of water from the Green River to supplement the water from the Uinta River would not have any negative impact to the project. The water in the Green River to be used contains less total dissolved salts, less dissolved arsenic, boron and selenium than the water presently found in the Uinta River at Randlett. Water from this project would be delivered to sprinkler irrigation systems and pipelines that significantly reduce salt concentrations in return flows.

### 3.3.5 Public Safety, Access, and Transportation

#### *3.3.5.1 No Action Alternative*

The No Action Alternative would have no impact on public safety, access, and transportation.

#### *3.3.5.2 Proposed Action Alternative*

The Proposed Action Alternative would have minor short-term effects during construction, but no long-term effects on public safety, access, and transportation would be realized.

### 3.3.6 Visual Resources

#### *3.3.6.1 No Action Alternative*

The No Action Alternative would have no impact on visual resources.

#### *3.3.6.2 Proposed Action Alternative*

There appears to be no popular or well-used key observation points to the project site from surrounding areas, except from the Green River itself. The impacts to the visual environment from the No Action Alternative will be noticeable by boaters and other water recreationalists. The existing old pump plant will be removed and area contoured and seeded to help mitigate this action. Down river several hundred yards and adjacent to the river the new pumping facility will feature two low-level structures with a gravel turn around and access, all fenced in to minimize un-necessary impacts. The contrast to the natural lines, textures, colors and forms will be medium; but within allowable measures for the area. The Bureau of Land Management has developed a color wheel that would be used to determine a color scheme for project facilities that would blend with the natural surroundings of the area.

### 3.3.7 Socioeconomics

#### *3.3.7.1 No Action Alternative*

Under the No Action Alternative there would be no adverse effects to socioeconomics. However, the District would need to find another method of getting water to the intended service area.

#### *3.3.7.2 Proposed Action Alternative*

Under the Proposed Action Alternative the water supply to the intended area would be strengthened to help ensure a constant and regular source of water for irrigation in the event of drought or other shortages. We would also expect to see new lands go into production which, previously, were unable to receive water due to a more constrained water supply. It is anticipated that there will not be a significant effect from the construction.

## 3.3.8 Cultural Resources

### *3.3.8.1 No Action Alternative*

Under the No Action Alternative there would be no adverse affects to cultural resources. There would be no need for ground disturbance for the pump station. The existing conditions would remain intact and would not be affected.

### *3.3.8.2 Proposed Action Alternative*

Class I and Class III cultural resource inventories for the APE resulted in the identification of no cultural resources. No sites will be impacted by the proposed action. Reclamation submitted a determination of no historic properties affected for the proposed project to the SHPO and received concurrence in a letter dated January 25, 2010.

## 3.3.9 Paleontological Resources

### *3.3.9.1 No Action Alternative*

Under the No Action Alternative there would be no adverse effects to paleontology. There would be no need for ground disturbance for the pump station. The existing conditions would remain intact and would not be affected

### *3.3.9.2 Proposed Action Alternative*

Under the Action Alternative there would be ground disturbing activities which have the potential to disturb subsurface fossil material. Unless fossils are discovered as a result of construction activities, however, the Action Alternative would have no effect on paleontological resources.

## 3.3.10 Wetlands and Vegetation

### *3.3.10.1 No Action Alternative*

The No Action Alternative would have no negative effect on wetlands and vegetation. However, the Nielson Pumping Station would not be rehabilitated with its associated beneficial effects for the area.

### *3.3.10.2 Proposed Action Alternative*

The U.S. Army Corps of Engineers has determined that the project is exempt from regulation under section 404 of the Clean Water Act. The access road qualifies for the Farm and Forest Road Exemption as long as all Best Management Practices are followed. The pipeline is exempt under the irrigation exemption. Therefore, a Department of the Army permit is not required for completion of this project. The District has obtained a stream alteration permit for the project.

The removal, revegetation, and rehabilitation of the Nielson Station would eliminate the potential for possible leaks of contaminants into the Green River from the crane and its fuelling and reduce the erosion that is currently occurring at this site. Costs for this rehabilitation would be paid by the District.

There is a possibility that bank hardening activities associated with the proposed project would have negative impacts to the river downstream by increasing flow energies. The project proponent would monitor the river below the project and mitigate for any erosion caused by the project.

Under the Proposed Action approximately 1/2 acre of wetlands would be lost due to the construction of the new GRPP. These areas would be mitigated by the decommissioning and restoration of the Neilson Pumping Plant. There would be no net loss of wetlands and vegetation.

## 3.3.11 Wildlife Resources

### *3.3.11.1 No Action Alternative*

The No Action Alternative would have no negative effects on wildlife. However, the Nielson Pumping Station would not be rehabilitated with its beneficial effects to wildlife habitat in the area.

### *3.3.11.2 Proposed Action Alternative*

Under the Proposed Action there would be no long term detrimental effects to wildlife.

During construction, temporary and minor negative impacts would occur. Initial construction activity would cause stress to some wildlife species from noise, dust, displacement, and temporary loss of habitat, until construction was completed.

In regards to the Green River fishery, appropriate measures, as stated in the environmental commitments section of this EA, would be taken to prevent, to the extent possible, construction related sediments from entering the river either during or after construction. These actions would insure that no significant effects would occur to this fishery.

Golden eagles are occasionally present in the project area and may be temporarily displaced by construction activities (noise and habitat disturbance). Cottonwood trees and dead snags should be avoided during construction. However, loss of several trees may occur. This could displace eagles. These effects would be short term or very limited in extent and would have no significant negative effects, since these birds would be able to use abundant similar roost sites or other habitat elements in the immediate vicinity of the project. A survey of Golden eagle nests would be conducted prior to any tree removing activities. This survey would be conducted by a biologist. This would be done in order to avoid any negative impacts to these birds to the extent possible.

A survey of ground nesting birds would be conducted prior to any ground disturbing activities. This survey would be conducted by a biologist. This would be done in order to avoid any negative impacts to these birds to the extent possible.

In order to avoid impacts to neotropical migratory birds as well as the yellow-billed cuckoo and other species, the Service requests that noise from the pumps be orientated away from bird habitat, towards the river and the access road. The tree sides of the pumping station directed toward riparian/bird habitat are the critical areas needing wall structures. The extent of disturbance associated by this project would leave a large area of suitable habitat unaffected, allowing use by these birds and other species to occur in these adjacent areas.

## 3.3.12 Threatened, Endangered, and Sensitive Species

### *3.3.12.1 No Action Alternative*

The No Action Alternative would have on effects on Threatened, Endangered, and Sensitive Species.

### *3.3.12.2 Proposed Action Alternative*

**Colorado River Endangered Fish**

The Proposed Project (with actions to reduce possible adverse effects listed below) may affect and would likely adversely affect Colorado River Endangered fish (i.e. Bonytail, Colorado pikeminnow, humpback chub, and razorback sucker) and their designated critical habitat. Larva of these fish species may be entrained in the intake system of the proposed pumps. In order to minimize and mitigate these impacts, pumps would be operated outside peak larval drift times to the extent possible. These times are from 10:00 pm to 2:00 am each day from April 1 to August 31.

The Pump Plant and Pond Operation Analysis described in Section 2.3.3 indicate that the pumping plant can operate to meet the Service's recommended fish blackout hours 78% of the time for the 10,000 af/yr, full project scenario. During the interim operation for the 8,500 af/yr scenario, project operation would meet the Service's recommendation 72% of the time for the two-pump scenario and 94% of the time for the three-pump scenario. These estimates assume the worst case operation with the full demand being pumped each year (wet years, average years, and dry years), whereas actual water pumped is expected to be reduced during wet years as shown in Table 2.3. This could reduce the impact by as much as one-half. Also, a cooperative, real-time operation with input from the Service as described in the operating criteria section could further reduce or even eliminate pumping during fish blackout hours for the two three-pump options.

Juveniles of these fish may also be entrained in the intake system. To avoid these impacts the Service has recommended that fish screens designed with 3/32 inch mesh openings be incorporated into the design of the intake system. Also, approach velocities to fish screens should not exceed 0.33 feet per second (fps), except under the agreed upon variance timings.

If in the future, the proposed project is determined to be responsible for presently unforeseen impacts, the District would be required to reinitiate Section 7

consultation with the Service. These could include, but are not limited to new construction activities not described here and water diversions greater than the 10,000 acre-feet scope of project.

Construction activities associated with the installation of pump station (including the cofferdam) would be limited to times of low water levels in the Green River. This is intended to reduce impacts to fish and other riverine species. Other BMPs discussed throughout this document and listed in the environmental commitments section also apply.

By the later part of August irrigation needs are reduced and the pump station would likely operate with 2 pumps instead of 3. Intake velocities during this time would be reduced as well.

**Actions to Reduce Potential Adverse Effects to Listed Species**
Since the designed pumping plant may exceed maximum intake flow velocities (required by the Service) under certain extreme scenarios, a variance to these requirements must be issued by the Service. The Service would issue the required variance as the following actions are met. These actions must be taken to minimize impacts to endangered Colorado River fish.

1. The pumps would be shut off during the midnight period (10pm to 2am) during the expected periods of larval drift (defined below) for both razorback sucker and Colorado pikeminnow, to the most practical amount consistent with the operating criteria defined in Section 2.3.3.3. Larval fish density in the water column is densest during these times. Therefore, this action would reduce the entrainment of larval fish into the pump system, thus minimizing impacts to larval fish.

    **a. Expected periods of larval drift:** The timing and length of larval drift periods are highly variable. Newly hatched razorback sucker larvae are generally captured during the ascending limb of the hydrograph from mid-April to June, while Colorado pikeminnow reproduction generally occurs after the peak runoff during June to August, when water temperatures exceed 16°C. We expect that the two larval drift periods will be distinct periods, but there may be overlap.

    **b. Communication of larval fish activity:** The District will send a letter to both the Upper Colorado River Endangered Fish Recovery Program and the Utah Ecological Services Office of the Service every April requesting to be informed when the larval drift periods begin and end. The Service would then provide the District with yearly data indicating the projected day when the larval drift begins and ends, so that the District only has to turn pumps off when larval fish are expected to be present. To acquire this information, the District would contact the Service at the respective addresses and phone numbers below:

Upper Colorado River Endangered Fish Recovery Program
P.O. Box 25486, DFC
Lakewood, CO 80225
(303) 969-7322

US Fish and Wildlife Service
Utah Ecological Services Office
2369 West Orton Circle, Suite 50
West Valley City, UT 84119
(801) 975-3330

2. As part of project operation, the actual approach velocity at the structure would be measured using up-to-date scientific methodology. The purpose of actual approach velocity measuring is to assist the Service in determining potential impacts from similar projects proposed in the future and thus would have no impact on operations of the GRPP. An appropriate method for this measurement is described in Carter et al. 2003. This would allow the Service to determine if design criteria were adequate to keep the approach velocities in the engineered, predicted range.

   **a. Timing of monitoring events:** The Service is interested in approach velocities during full project operation at various levels of flows in the Green River. Therefore the project facility needs to be operating at full operational capacity (at the highest level of expected project diversion) during all required monitoring events.

   The Service requires that three monitoring events take place so that a comparison of approach velocities at various Green River flows can be made.

   - The first monitoring event would need to take place during the first year after construction and after peak flows have subsided, most likely in August.

     If operational capacity of the structure is increased during the life of the project, such as adding a pump or increasing the diverted amount, another monitoring event would need to take place.

   - A second monitoring event would need to take place if the flow of the Green River falls below 5000 cubic feet per second (cfs), as measured at the USGS Green River at Ouray, Utah gauge, during project operations.

   - A third monitoring event would need to take place if the flow of the Green River falls below 2000 cfs at the Ouray gauge during project operations.

**b. Participation:** The exact timing of the monitoring events should be mutually agreed upon by the District and the Service. In addition, the Service would like to be notified of these monitoring events and be allowed to participate.

**c. Techniques:** The Service provided the District with a scientific paper describing how these monitoring events were conducted in Washington State for similar purposes (Pacific Northwest National Laboratory 2003). The District would perform similar techniques or would contact the Service to get prior approval for differing techniques.

**Other Listed Species**

The black-footed ferret, Canada lynx and Mexican spotted owl are not known to occur in the project area and would not be affected by the Proposed Action

Western yellow-billed cuckoo are known to exist in the vicinity of the area affected by the Proposed Action. The Proposed Action would not impact current cuckoo nesting behavior or habitat. Even though no cuckoo nesting occurs near the project area, the Service has requested that construction activities associated with this project be halted during their nesting season (April 1 to July 31). This would minimize any impacts to these birds. Also, all possible cottonwood trees should be left unaltered during construction. Since cottonwood trees have been removed from the riparian zone or replaced by exotic species over time, the planting of these trees would help improve nesting habitat conditions for these birds. These trees should be planted in areas not affected by noise created by the GRPP.

No threatened, endangered, or candidate plant species would be effected by the Proposed Action.

Bald eagles are winter residents of this area and may be displaced by construction activities (noise and habitat disturbance). Cottonwood trees and dead snags should be avoided during construction. However, loss of several trees may occur. This could displace eagles. These effects would be short term or very limited in extent and would have no significant negative effects, since these birds would be able to use abundant similar roost sites or other habitat elements in the immediate vicinity of the project. All winter construction activities occurring within ½ mile of any bald eagle roost site would be restricted to hours between 9:00 a.m. and 4:00 p.m., from November 1st to March 31st and into April, if necessary, until all bald eagles have left the area.

Fish species managed under conservation agreements (i.e. Colorado River cutthroat trout, bluehead sucker, flannelmouth sucker, and roundtail chub) may be temporarily disturbed within areas where construction activities affect riparian or riverine habitats. These species would likely move to areas unaffected by the

Proposed Action, either upstream or downstream. Sedimentation of the river below constriction areas would disturb spawning and feeding beds temporarily until flushing flows restore these habitats.

Northern goshawk may use habitats within the area of disturbance. The extent of disturbance associated by this project would leave large areas of suitable habitat unaffected, allowing any possible use by these birds to occur in these adjacent areas. Therefore, affects to them would be negligible.

The removal, revegetation, and rehabilitation of the Nielson Pumping Station would improve habitat conditions for many species of wildlife in this area. This would also eliminate the potential for possible leaks of contaminants into the Green River and reduce the erosion that is currently occurring, thus improving riverine habitat conditions for endangered and other fish species. The removal of this station would eliminate the hazard this station poses for entrainment of larval and young-of-year (YOY) endangered fish species.

## 3.4 Summary of Environmental Effects

Table 3.1 summarizes environmental effects under the No Action Alternative and the Proposed Action Alternative.

**Table 3.1**
**Summary of Environmental Effects**

| | Alternatives | |
|---|---|---|
| **Resource Issue** | **No Action Alternative** | **Proposed Action Alternative** |
| Recreation | No Effect | No Effect |
| Water Rights | No Effect | No Effect |
| Water Resources | No Effect | No Effect |
| Water Quality | No Effect | No Effect |
| Public Safety, Access, and Transportation | No Effect | Minor short term effects during construction |
| Visual Resources | No Effect | No Effect |
| Socioeconomics | No Effect | No Effect |
| Cultural Resources | No Effect | Potential effects to subsurface cultural material during construction. |
| Paleontological Resources | No Effect | Potential effects to subsurface fossils during construction |
| Wetlands and Vegetation | No Effect | Minor, short term effects, Long term effects would be mitigated |
| Wildlife Resources | No Effect | Minor, short term effects |
| Threatened and Endangered Species | No Effect | Adverse effects likely, mitigation efforts would minimize these effects |

## 3.5 Indian Trust Assets

Indian Trust Assets (ITA's) are legal interests in property held in trust by the United States for Indian tribes or individuals. The Department of the Interior's policy is to recognize and fulfill its legal obligations to identify, protect and

conserve the trust resources of federally recognized Indian tribes and tribal members, and to consult with tribes on a government-to-government basis whenever plans or actions affect tribal trust resources, trust assets, or tribal safety (please refer to Departmental manual, 512 DM 2). Under this policy, as well as Reclamation's ITA policy, Reclamation is committed to carrying out its activities in a manner which avoids adverse impacts to ITAs when possible, and to mitigate or compensate for such impacts when it cannot. All impacts to ITAs, even those considered nonsignificant, must be discussed in the trust analyses in NEPA compliance documents and appropriate compensation or mitigation must be implemented.

Trust assets may include lands, minerals, hunting and fishing rights, traditional gathering grounds, and water rights. Impacts to ITA's are evaluated by assessing how the action affects the use and quality of ITAs. Any action that adversely affects the use, value, quality or enjoyment of an ITA is considered to have an adverse impact to the resources. There are no known ITA's in the project area vicinity, and no ITA concerns were identified by potentially affected tribes during the tribal consultation process.

## 3.6 Environmental Justice

Executive Order 12898 established environmental justice as a federal agency priority to ensure that minority and low-income groups are not disproportionately affected by federal actions. The GRPP is located in Uintah County. The estimated Uintah County population for 2009 was 31,536. Statistics for the year 2000, the most recent census data, shows a county population of 25,224 consisting of 2371 individuals (9.4%) living below poverty level and 3585 (14.2%) belonging to various minority groups with 2190 (7.6%) belonging to the American Indian group. (US Census Bureau ).

Implementation of the Proposed Action would not disproportionately (unequally) affect any low-income or minority communities within the project area. The reason for this is that the Proposed Action would not involve major facility construction, population relocation, health hazards, hazardous waste, or substantial economic impacts. This alternative would therefore have no adverse human health or environmental effects on minority and low-income populations as defined by environmental justice policies and directives.

# Chapter 4 – Environmental Commitments

The following environmental commitments would be implemented as an integral part of the Proposed Action.

1. Standard Reclamation Management Practices - Standard Reclamation management practices would be applied during construction activities to minimize environmental effects and would be implemented by construction forces or included in construction specifications. Such practices or specifications include sections in the present report on public safety, dust abatement, air pollution, noise abatement, water pollution abatement, waste material disposal, erosion control, archaeological and historical resources, vegetation, and wildlife. Excavated material and construction debris may not be wasted in any stream or river channel or placed in flowing waters. This includes material such as grease, oil, joint coating, or any other possible pollutant. Excess materials must be wasted at an upland site well away from any channel. Construction materials, bedding material, excavation material, etc. may not be stockpiled in riparian or water channel areas. Silt fencing would be appropriately installed and left in place until after revegetation becomes established, at which time the silt fence can then be carefully removed. Machinery must be fueled and properly cleaned of dirt, weeds, organisms, or any other possibly contaminating substances offsite prior to construction.

2. Additional Analyses - If the proposed action were to change significantly from that described in this EA because of additional or new information, or if other spoil, or work areas beyond those outlined in this analysis are required outside the defined project construction area, additional environmental analyses may be necessary.

3. State Stream Alteration Permit - The District would obtain a State Stream Alteration Permit from the Department of Natural Resources. Conditions and requirements of this Permit would be strictly adhered to by the District.

4. Utah Pollutant Discharge Elimination System Permit - A Utah Pollutant Discharge Elimination System Permit would be required from the State of Utah before any discharges of water, if such water is to be discharged as a point source into the Green River. Appropriate measures would be taken to ensure that construction related sediments would not enter the stream either during or after construction. Settlement ponds and intercepting ditches for capturing sediments would be constructed and the sediment and other

contents collected would be hauled off the site for appropriate disposal upon completion of the project.

5. Water Quality Certification and Storm Water Discharge Permit - Under authority of the Clean Water Act, construction would require from the Utah Division of Water Quality a Section 401 Water Quality Certification and a Section 402 Storm Water Discharge Permit. Whenever the project proponent causes the water turbidity in an adjacent surface water to increase 10 NTU's or more, the Utah Division of Water Quality shall be notified.

6. Cultural Resources - Any person who knows or has reason to know that he/she has inadvertently discovered possible human remains on Federal land, he/she must provide immediate telephone notification of the discovery to Reclamation's Provo Area Office archaeologist. Work would stop until the proper authorities are able to assess the situation onsite. This action would promptly be followed by written confirmation to the responsible Federal agency official, with respect to Federal lands. The Utah SHPO and interested Native American tribal representatives would be promptly notified. Consultation would begin immediately. This requirement is prescribed under the Native American Graves Protection and Repatriation Act (43 CFR Part 10); and the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470).

7. Paleontological Resources--Should vertebrate fossils be encountered by the proponent during ground disturbing actions, construction must be suspended until a qualified paleontologist can be contacted to assess the find.

8. Previously Disturbed Areas - Construction activities should be confined to previously disturbed areas where possible for such activities as work, staging, and storage; waste areas; and vehicle and equipment parking areas. Vegetation disturbance should be minimized as much as possible.

9. Public Access - Construction sites would be closed to public access. Temporary fencing, along with signs, would be installed to prevent public access. Reclamation would coordinate with landowners or those holding special permits and other authorized parties regarding access to or through the project area.

10. Disturbed Areas - All disturbed areas resulting from the project would be smoothed, shaped, contoured, and rehabilitated to as near their pre-project construction condition as practicable. After completion of the construction and restoration activities, disturbed areas would be seeded at appropriate times with weed-free, native seed mixes having a variety of appropriate species (especially woody species where feasible) to help hold the soil around structures, prevent excessive erosion, and to help maintain other riverine and riparian functions. The composition of seed mixes would be

coordinated with wildlife habitat specialists. Weed control on all disturbed areas would be required. Successful revegetation efforts must be monitored and reported to Reclamation along with photos of the completed project.

11. Fisheries –

    a. Construction activities should avoid, to the extent feasible, fish habitat such as backwaters and side channels;

    b. Best Management practices should be used to minimize sedimentation, temporary erosion of stream banks, and needless damage or alteration to the streambed, and ensure construction related byproducts do not enter the riverine ecosystem that would cause negative impacts to aquatic organisms;

        (1) Construction activities should be timed to reduce impacts to seasonal fish movements, spawning activity, and rearing activity (April 1 through August 31) depending on the water year;

        (2) The construction contractor will contact the UDWR to complete a fish survey and clearance immediately prior to and following:

            - Construction of the proposed cofferdam,
            - Removal of the cofferdam, and
            - Any other occasions when activities occur in the river or in the exposed river channel (e.g., when and if repairs need to be made to the cofferdam).

        (3) The contractor will be responsible for reporting any observed take of fish (stressed or dying) immediately to the USFWS Utah Field Office. After placement of the cofferdam, a report will be submitted to the Utah Field Office that summarizes activities.

        (4) The construction contractor will coordinate with the UDWR to have a federally permitted crew on site to translocate fish stranded behind the constructed cofferdam to the Green River prior to dewatering the work areas.

        (5) Pumps used to dewater the work area will be screened (1/4'' mesh) to minimize entrapment of fish.

        (6) The contractor will minimize the time that the cofferdam is in the river.

        (7) As practicable, sections of the coffer dam will be placed gently in the channel to minimize disturbance to fish and the river substrates.

(8) All non-permanent materials placed in the river will be removed from the river after completion of the in channel portion of project.

12. Nielson Pumping Station - With the relocation of the existing Nielson Pumping Station to the new pump site, the existing site will be rehabilitated to as near natural condition as practicable consistent with the methods and requirements described in Environmental Commitment number 10 above. The removal and revegetation of the Nielson Station would eliminate the potential for possible leaks of contaminants into the Green River. Previous oil spills in this area must be removed and disposed of at appropriate facilities.

13. Bank hardening caused by the installation of the sheet piles to protect the pump station has the potential for altering erosion patterns of the Green River immediately downstream of the pump station. If additional erosion occurs as a result of hardening the bank for the pump station, additional bank protection would be provided by the District at District expense.

14. Birds - A survey of ground nesting birds (especially neotropical migrants) and raptor nests would be conducted prior to any ground disturbing activities. These surveys would be conducted by a biologist. This would be done in order to avoid any negative impacts to these birds to the extent possible.

15. GRPP Operation – Since the designed pumping plant may exceed maximum flow velocities (prescribed by the Service) under certain extreme scenarios, the Service has required that the following actions be met to reduce potential adverse effects to Colorado River listed fish species. These actions must be taken to minimize impacts to endangered Colorado River fish.

**Actions to Minimize Impacts to Endangered Colorado River Fish**

a. The pumps would be shut off during the midnight period (10pm to 2am) during the expected periods of larval drift (defined below) for both razorback sucker and Colorado pikeminnow, to the most practical amount consistent with the operating criteria described in Section 2.3.3.3. Larval fish density in the water column is densest during these times. Therefore, this action would reduce the entrainment of larval fish into the pump system, thus minimizing impacts to larval fish.

(1) **Expected periods of larval drift:** The timing and length of larval drift periods are highly variable. Newly hatched razorback sucker larvae are generally captured during the ascending limb of the hydrograph from mid-April to June, while Colorado pikeminnow reproduction generally occurs after the peak runoff during June to

August, when water temperatures exceed 16°C. We expect that the two larval drift periods will be distinct periods, but there may be overlap.

2. **Communication of larval fish activity:** The District will send a letter to both the Upper Colorado River Endangered Fish Recovery Program and the Utah Ecological Services Office of the Service every April requesting to be informed when the larval drift periods begin and end. The Service would then provide the District with yearly data indicating the projected day when the larval drift begins and ends, so that the District only has to turn pumps off when larval fish are expected to be present. To acquire this information, the District would contact the Service at the respective addresses and phone numbers below:

   Upper Colorado River Endangered Fish Recovery Program
   P.O. Box 25486, DFC
   Lakewood, CO 80225
   (303) 969-7322

   US Fish and Wildlife Service
   Utah Ecological Services Office
   2369 West Orton Circle, Suite 50
   West Valley City, UT 84119
   (801) 975-3330

b. As part of project operation, the actual approach velocity at the structure would be measured using up-to-date scientific methodology. The purpose of actual approach velocity measuring is to assist the Service in determining potential impacts from similar projects proposed in the future and thus would have no impact on operations of the GRPP. An appropriate method for this measurement is described in Carter et al. 2003. This would allow the Service to determine if design criteria were adequate to keep the approach velocities in the engineered, predicted range.

   (1) **Timing of monitoring events:** The Service is interested in approach velocities during full project operation at various levels of flows in the Green River. Therefore the project facility needs to be operating at full operational capacity (at the highest level of expected project diversion) during all required monitoring events.

   The Service requires that three monitoring events take place so that a comparison of approach velocities at various Green River flows can be made.

- The first monitoring event would need to take place during the first year after construction and after peak flows have subsided, most likely in August.
  If operational capacity of the structure is increased during the life of the project, such as adding a pump or increasing the diverted amount, another monitoring event would need to take place.

- A second monitoring event would need to take place if the flow of the Green River falls below 5000 cubic feet per second (cfs), as measured at the USGS Green River at Ouray, Utah gauge, during project operations.

- A third monitoring event would need to take place if the flow of the Green River falls below 2000 cfs at the Ouray gauge during project operations.

(2) **Participation:** The exact timing of the monitoring events should be mutually agreed upon by the District and the Service. In addition, the Service would like to be notified of these monitoring events and be allowed to participate.

(3) **Techniques:** The Service provided the District with a scientific paper describing how these monitoring events were conducted in Washington State for similar purposes (Pacific Northwest National Laboratory 2003). The District would perform similar techniques or would contact the Service to get prior approval for differing techniques.

16. Meeting and Protecting the Flow and Temperature Recommendations for Endangered Fishes Downstream of Flaming Gorge Dam (Flow Recommendations) - Meeting the Flow Recommendations (Muth et. al, 2000) is essential for endangered fish recovery in the Green River Basin (Basin). Development of Basin water may impact Reclamation's ability to meet the Flow Recommendations, even if the developed water is Flaming Gorge storage water. In order to work towards meeting the Flow Recommendations in the future, Reclamation will analyze the long-term, cumulative effects of water development and delivery in the Basin, including water service contracts. Specifically, Reclamation is working on a modeling effort to determine how the interaction of Flaming Gorge releases, tributary inflows, and water development impacts the Flow Recommendations. This modeling effort is concurrent with interagency efforts (Service, Reclamation, State of Utah and others) to create a mechanism to protect flows in the Green River, as described in the Upper Colorado River Endangered Fish Recovery Program's Recovery Implementation Plan.

Until these efforts are complete, special focus must be made on meeting the Flow Recommendations in dry and moderately dry years (as classified in Muth et. al, 2000). In years classified as dry or moderately dry, Reclamation will use the best available information to compensate for the Project depletion in the Basin. If the Service has reason to believe that the Flow Recommendations, specifically, the baseflow targets for Reach 2 established by the Flaming Gorge Technical Workgroup are not being met, extra releases (up to the amount of Project depletions) from Flaming Gorge will be provided.

# Chapter 5 – Consultation and Coordination

## 5.1 Introduction

This chapter details the consultation and coordination between Reclamation and other Federal, State, and local government agencies, Native American Tribes, and the public during the preparation of this EA. Compliance with NEPA is a federal responsibility that involves the participation of all of these entities in the planning process. NEPA requires full disclosure about major actions taken by Federal agencies and accompanying alternatives, impacts, and potential mitigation of impacts.

## 5.2 Public Involvement

This draft EA is being distributed to approximately 59 individuals, organizations and agencies for a 30-day period of review and comment. Comments received on the draft EA will be carefully and completely considered in determining any needed revisions to the EA and whether a Finding of No Significant Impact can be issued.

## 5.3 Native American Consultation

Reclamation conducted Native American consultation throughout the public involvement process. A consultation letter and copy of the Class III cultural resource inventory report were sent to the Ute Indian Tribe of the Uintah and Ouray Reservation. This consultation was conducted in compliance with 36 CFR 800.2(c)(2) on a government-to-government basis. Through this effort the tribe is given a reasonable opportunity to identify any concerns about historic properties; to advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance; to express their views on the effects of the proposed action on such properties; and to participate in the resolution of adverse effects. Reclamation received no response regarding effects to historic properties from the Ute Indian Tribe of the Uintah and Ouray Reservation.

## 5.4 Utah State Historic Preservation Office

A copy of the Class III cultural resource report and a determination of no historic properties affected for the proposed project were submitted to the SHPO in January 2010. SHPO concurred with Reclamation's determination of no historic properties affected in a letter dated January 25, 2010.

## 5.5 Utah Geological Survey

A paleontological file search was conducted by Martha Hayden, Paleontological Assistant with the Utah Geological Survey (UGS). File search results and recommendations from the UGS were received in a letter dated January 26, 2010.

# Chapter 6 – Preparers

The following contributors to the EA are employees of the U.S. Department of the Interior, Bureau of Reclamation, Provo Area Office and the Upper Colorado Regional Office.

| Name | Position Title | Contribution |
|---|---|---|
| Brian Joseph, MA | Archaeologist | Cultural Resources; Paleontological Resources |
| W. Russ Findlay, MS | Fish and Wildlife Biologist | Wildlife Resources, Vegetation, T&E Species, Environmental Compliance |
| Beverley Heffernan, AB | Chief, Environmental Group | NEPA Compliance; Environmental Justice; Indian Trust Assets; Agency Review |
| Johnn Sterzer | Landscape Architect | Recreation, Visual Resources |
| Linda Andra | Administrative Assistant | Technical Writing and Editing |
| Mike Draper | Engineering Draftsman | Geologic Section Maps |
| Greg Lott, BS | Geologist | Geology Drawings |
| Rafael A. Lopez, BA | General Biologist | Wetlands, CWA Compliance, 404 Permit |
| Don Merrill | Public Involvement Specialist | Consultation and Coordination |
| Robert Radtke, Ph.D. | Physical Scientist | Water Quality |
| Scott Taylor, MS | Economist | Socioeconomics |
| Justin Record, PE[a] | Civil Engineer | Review of Water Rights |
| Ira Terry | Geologist | Geology Report |
| Heather Patno | Hydrologist | Water Resources and Operations |
| Gary Carlson | Chief, Security and Dam Safety Group | Public Safety, Access, and Transportation |

a = Registered Professional Engineer
b = Registered Landscape Architect

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